Vol. 1122 Number 5

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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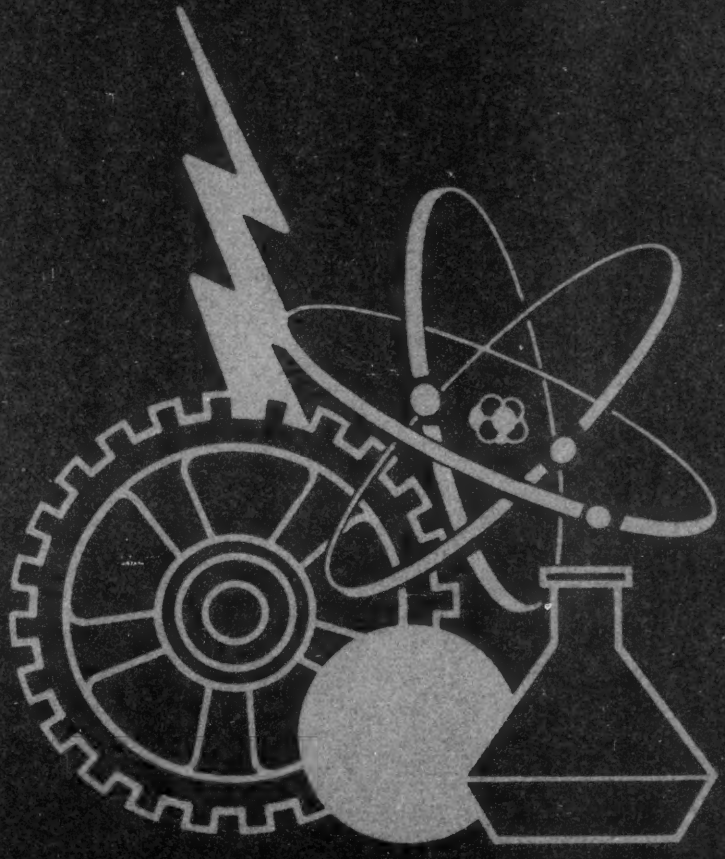
PATENTS

January 29, 1991



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

January 29, 1991 Volume 1122 Number 5

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THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

[26] In the case of a suggestion for rehearing en banc, we obtain approval from the Solicitor General.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Nov. 1, 1990, and was announced in the *Official Gazette* at 1119 O.G. 54 on Oct. 23, 1990.

International PCT fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Dec. 6 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of December 31, 1990.

Chemical Discipline -	March 1, 1990
Mechanical Discipline -	September 1, 1989
Electrical Discipline -	December 7, 1989

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting the Setting of Hearing Date as of December 31, 1990.

Chemical -	October 2, 1989
Electrical -	No cases awaiting to be set for Hearing
Mechanical -	No cases awaiting to be set for Hearing

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of December 1990.

Affirmed	160
Affirmed-in-Part	33
Reversed	87
Total Decided	280

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth

in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on January 26, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,720,874 through 4,722,097
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on January 24, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,426,739 through 4,428,078
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e) and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant $245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant ..... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) $415.00
By other than a small entity ..... $850.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)) $835.00
By other than a small enttity ..... $1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982 ..... $120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)) $60.00
By other than a small entity ..... $120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable ..... $550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED NOVEMBER 18, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 32,419	06/822,866	5/12/87
(4,359,613)	(06/244,054)	(11/16/82)
4,358,860	06/240,996	11/16/82
4,358,871	06/245,746	11/16/82
4,358,889	06/268,086	11/16/82
4,358,890	06/293,903	11/16/82
4,358,892	06/253,095	11/16/82
4,358,895	06/277,899	11/16/82
4,358,908	06/219,846	11/16/82
4,358,917	06/262,083	11/16/82
4,358,950	06/227,748	11/16/82
4,358,951	06/235,082	11/16/82
4,358,977	06/299,649	11/16/82
4,358,981	06/220,312	11/16/82
4,358,997	06/281,146	11/16/82
4,359,024	06/243,099	11/16/82
4,359,059	06/240,854	11/16/82
4,359,061	06/239,142	11/16/82
4,359,090	06/297,539	11/16/82
4,359,104	06/256,535	11/16/82
4,359,105	06/247,581	11/16/82
4,359,158	06/255,445	11/16/82
4,359,171	06/287,707	11/16/82
4,359,210	06/226,989	11/16/82
4,359,242	06/302,305	11/16/82
4,359,248	06/278,506	11/16/82
4,359,263	06/248,716	11/16/82
4,359,264	06/249,194	11/16/82
4,359,278	06/316,525	11/16/82
4,359,300	06/221,006	11/16/82
4,359,318	06/332,159	11/16/82
4,359,320	06/226,036	11/16/82
4,359,321	06/299,039	11/16/82
4,359,329	06/252,744	11/16/82
4,359,338	06/254,787	11/16/82
4,359,339	06/312,213	11/16/82
4,359,350	06/248,121	11/16/82
4,359,364	06/240,247	11/16/82
4,359,373	06/273,324	11/16/82
4,359,376	06/262,373	11/16/82
4,359,377	06/226,062	11/16/82
4,359,381	06/262,433	11/16/82
4,359,382	06/265,052	11/16/82
4,359,390	06/357,078	11/16/82
4,359,392	06/220,880	11/16/82
4,359,395	06/314,003	11/16/82
4,359,404	06/306,834	11/16/82
4,359,408	06/270,282	11/16/82
4,359,412	06/267,850	11/16/82
4,359,415	06/269,995	11/16/82
4,359,421	06/225,157	11/16/82
4,359,431	06/259,880	11/16/82
4,359,471	06/312,314	11/16/82
4,359,475	06/333,010	11/16/82
4,359,484	06/238,289	11/16/82

Patent Number	Serial Number	Issue Date
4,359,494	06/281,204	11/16/82
4,359,506	06/217,310	11/16/82
4,359,511	06/334,895	11/16/82
4,359,522	06/291,696	11/16/82
4,359,523	06/291,697	11/16/82
4,359,538	06/255,812	11/16/82
4,359,543	06/288,598	11/16/82
4,359,563	06/265,077	11/16/82
4,359,565	06/288,076	11/16/82
4,359,575	06/265,743	11/16/82
4,359,583	06/302,017	11/16/82
4,359,596	06/289,324	11/16/82
4,359,615	06/292,440	11/16/82
4,359,672	06/282,006	11/16/82
4,359,703	06/272,664	11/16/82
4,359,746	06/256,571	11/16/82
4,359,749	06/225,659	11/16/82
4,359,751	06/256,586	11/16/82
4,622,701	06/780,180	11/18/86
4,622,702	06/797,225	11/18/86
4,622,706	06/653,092	11/18/86
4,622,709	06/715,961	11/18/86
4,622,710	06/709,067	11/18/86
4,622,711	06/637,214	11/18/86
4,622,718	06/630,919	11/18/86
4,622,725	06/778,133	11/18/86
4,622,728	06/535,702	11/18/86
4,622,731	06/598,345	11/18/86
4,622,734	06/607,179	11/18/86
4,622,741	06/731,824	11/18/86
4,622,744	06/672,874	11/18/86
4,622,748	06/512,552	11/18/86
4,622,750	06/794,746	11/18/86
4,622,754	06/465,492	11/18/86
4,622,763	06/592,262	11/18/86
4,622,764	06/670,921	11/18/86
4,622,766	06/740,503	11/18/86
4,622,767	06/717,214	11/18/86
4,622,773	06/701,688	11/18/86
4,622,774	06/710,706	11/18/86
4,622,782	06/764,041	11/18/86
4,622,783	06/829,556	11/18/86
4,622,787	06/696,779	11/18/86
4,622,788	06/486,293	11/18/86
4,622,811	06/725,659	11/18/86
4,622,815	06/485,577	11/18/86
4,622,825	06/727,169	11/18/86
4,622,834	06/737,672	11/18/86
4,622,838	06/821,709	11/18/86
4,622,840	06/755,669	11/18/86
4,622,850	06/733,489	11/18/86
4,622,857	06/661,370	11/18/86
4,622,863	06/663,595	11/18/86
4,622,865	06/676,197	11/18/86
4,622,868	06/718,492	11/18/86
4,622,881	06/679,064	11/18/86
4,622,882	06/623,391	11/18/86
4,622,883	06/820,680	11/18/86
4,622,884	06/565,356	11/18/86
4,622,889	06/807,283	11/18/86
4,622,892	06/731,460	11/18/86
4,622,899	06/543,112	11/18/86
4,622,902	06/635,710	11/18/86
4,622,903	06/621,929	11/18/86
4,622,911	06/643,364	11/18/86
4,622,912	06/578,577	11/18/86
4,622,918	06/656,986	11/18/86
4,622,921	06/801,600	11/18/86
4,622,937	06/719,729	11/18/86
4,622,944	06/761,170	11/18/86
4,622,946	06/734,932	11/18/86
4,622,959	06/708,393	11/18/86
4,622,962	06/724,759	11/18/86
4,622,969	06/617,750	11/18/86
4,622,986	06/794,700	11/18/86
4,622,990	06/728,253	11/18/86
4,623,001	06/669,601	11/18/86
4,623,002	06/715,630	11/18/86
4,623,005	06/620,108	11/18/86
4,623,007	06/755,160	11/18/86
4,623,009	06/742,612	11/18/86
4,623,029	06/768,122	11/18/86
4,623,036	06/754,855	11/18/86
4,623,037	06/797,931	11/18/86
4,623,046	06/754,083	11/18/86
4,623,058	06/668,845	11/18/86
4,623,061	06/642,630	11/18/86
4,623,062	06/797,041	11/18/86
4,623,065	06/722,005	11/18/86
4,623,066	06/694,812	11/18/86
4,623,073	06/651,887	11/18/86
4,623,075	06/690,038	11/18/86
4,623,080	06/682,074	11/18/86
4,623,083	06/638,242	11/18/86
4,623,090	06/712,800	11/18/86
4,623,094	06/580,998	11/18/86
4,623,113	06/708,977	11/18/86
4,623,119	06/792,043	11/18/86
4,623,126	06/562,414	11/18/86
4,623,127	06/657,822	11/18/86
4,623,130	06/522,648	11/18/86
4,623,133	06/690,588	11/18/86
4,623,134	06/810,822	11/18/86
4,623,141	06/728,349	11/18/86
4,623,143	06/691,697	11/18/86
4,623,152	06/720,421	11/18/86
4,623,157	06/610,297	11/18/86
4,623,158	06/774,010	11/18/86
4,623,168	06/663,157	11/18/86
4,623,171	06/579,364	11/18/86
4,623,175	06/550,745	11/18/86
4,623,177	06/696,076	11/18/86
4,623,180	06/712,248	11/18/86
4,623,184	06/737,099	11/18/86
4,623,185	06/740,822	11/18/86
4,623,199	06/247,012	11/18/86
4,623,206	06/687,528	11/18/86
4,623,212	06/581,682	11/18/86
4,623,217	06/513,117	11/18/86
4,623,224	06/422,214	11/18/86
4,623,231	06/658,478	11/18/86
4,623,232	06/676,080	11/18/86
4,623,235	06/631,890	11/18/86
4,623,241	06/524,099	11/18/86
4,623,249	06/543,115	11/18/86
4,623,263	06/667,347	11/18/86
4,623,275	06/610,872	11/18/86
4,623,276	06/743,248	11/18/86
4,623,290	06/584,401	11/18/86
4,623,301	06/676,289	11/18/86
4,623,310	06/727,004	11/18/86
4,623,316	06/511,402	11/18/86
4,623,319	06/695,886	11/18/86
4,623,332	06/485,046	11/18/86
4,623,333	06/655,379	11/18/86
4,623,344	06/729,531	11/18/86
4,623,377	06/725,073	11/18/86
4,623,379	06/681,765	11/18/86
4,623,380	06/697,506	11/18/86
4,623,381	06/521,661	11/18/86
4,623,419	06/719,581	11/18/86
4,623,421	06/634,476	11/18/86
4,623,422	06/706,398	11/18/86
4,623,436	06/817,690	11/18/86
4,623,459	06/646,246	11/18/86
4,623,465	06/793,484	11/18/86
4,623,467	06/623,918	11/18/86
4,623,468	06/713,372	11/18/86
4,623,469	06/705,667	11/18/86
4,623,472	06/720,518	11/18/86
4,623,477	06/654,877	11/18/86
4,623,492	06/757,303	11/18/86
4,623,497	06/675,877	11/18/86
4,623,498	06/630,178	11/18/86
4,623,504	06/663,584	11/18/86
4,623,509	06/471,169	11/18/86

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4,623,517	06/635,487	11/18/86
4,623,535	06/572,022	11/18/86
4,623,538	06/791,383	11/18/86
4,623,547	06/800,550	11/18/86
4,623,551	06/753,996	11/18/86
4,623,559	06/755,134	11/18/86
4,623,565	06/739,585	11/18/86
4,623,566	06/677,097	11/18/86
4,623,583	06/401,735	11/18/86
4,623,584	06/696,988	11/18/86
4,623,599	06/749,544	11/18/86
4,623,604	06/695,408	11/18/86
4,623,620	06/519,563	11/18/86
4,623,628	06/748,951	11/18/86
4,623,631	06/602,032	11/18/86
4,623,638	06/714,675	11/18/86
4,623,641	06/774,177	11/18/86
4,623,642	06/808,225	11/18/86
4,623,644	06/763,392	11/18/86
4,623,655	06/676,161	11/18/86
4,623,656	06/704,744	11/18/86
4,623,668	06/614,142	11/18/86
4,623,677	06/763,512	11/18/86
4,623,679	06/744,224	11/18/86
4,623,697	06/728,966	11/18/86
4,623,708	06/707,049	11/18/86
4,623,716	06/667,025	11/18/86
4,623,721	06/613,184	11/18/86
4,623,723	06/588,068	11/18/86
4,623,749	06/620,163	11/18/86
4,623,769	06/543,253	11/18/86
4,623,774	06/682,251	11/18/86
4,623,775	06/798,443	11/18/86
4,623,778	06/597,612	11/18/86
4,623,779	06/572,460	11/18/86
4,623,780	06/521,344	11/18/86
4,623,787	06/557,889	11/18/86
4,623,792	06/714,245	11/18/86
4,623,794	06/612,850	11/18/86
4,623,797	06/507,925	11/18/86
4,623,810	06/696,633	11/18/86
4,623,822	06/654,395	11/18/86
4,623,824	06/618,055	11/18/86
4,623,839	06/532,365	11/18/86
4,623,840	06/627,905	11/18/86
4,623,842	06/524,779	11/18/86
4,623,862	06/686,981	11/18/86
4,623,865	06/732,104	11/18/86
4,623,868	06/689,799	11/18/86
4,623,873	06/736,945	11/18/86
4,623,881	06/566,722	11/18/86
4,623,885	06/456,028	11/18/86
4,623,889	06/643,828	11/18/86
4,623,895	06/600,644	11/18/86
4,623,898	06/693,276	11/18/86
4,623,923	06/474,954	11/18/86
4,623,942	06/734,182	11/18/86
4,623,953	06/729,371	11/18/86
4,623,957	06/662,575	11/18/86
4,623,959	06/807,423	11/18/86
4,623,966	06/580,510	11/18/86

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in theindicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,506,318, Re. S. N. 07/524,188, Filed April 27, 1990, Cl. 363, INVERTER WITH CONTROLLABLE RMS OUTPUT VOLTAGE MAGNITUDE, Ole K. Nilssen, Owner of Record: *Inventor*, Attorney or Agent: None, Ex. Gp.: 212

4,787,160, Re. S. N. 07/619,746, Filed Nov. 28, 1990, Cl. 40/124.1, GREETING CARD CONFETTI DELIVERY SYSTEM, Lawrence J. Balsamo, Owner of Record: *Inventor*, Attorney or Agent: Dillis V. Allen, Ex. Gp.: 357

4,790,130, Re. S. N. 07/626,548, Filed Dec. 12, 190, Cl. 57/261, SPINNING UNIT PIECING PROCESS FOR PRODUCING FEED SPOOLS, Fritz Stahlecker, et al., Owner of Record: *Inventor*, Attorney or Agent: Donald D. Evenson, Ex. Gp.: 245

4,790,204, Re. S. N. 07/626,988, Filed Dec. 13, 1990, Cl. 74/483, ELECTRIC SHIFT APPARATUS, Edward L. Tury, et al., Owner of Record: *Automotive Products (USA) Inc., Sterling Heights, Mich.*, Attorney or Agent: Donald L. Wood, Ex. Gp.: 354

4,795,047, Re. S. N. 07/622,668, Filed Dec. 5, 1990, Cl. 220/1.5, CONTAINER AND CONSTRUCTION THEREFOR, Edward H. Dunwoodie, Owner of Record: *Century Aero Products International, Inc., Compton, Calif.*, Attorney or Agent: Albert M. Herzig, Ex. Gp.: 241

4,796,105, Re. S. N. 07/627,002, Filed Dec. 13, 1990, Cl. 360/14.1, HELICAL SCAN TYPE MAGNETIC RECORDING AND REPRODUCING APPARATUS FOR RECORDING AND REPRODUCING DIGITAL SIGNAL, Akinori Mawatari, Owner of Record: *Teac Corp., Tokyo, Japan*, Attorney or Agent: William B. Kempler, Ex. Gp.: 235

4,821,888, Re. S. N. 07/625,300, Filed Dec. 10, 1990, Cl. 211/1.5, CAROUSEL MATERIAL HANDLING APPARATUS, William P. Hankes, Owner of Record: *Inventor*, Attorney or Agent: Timothy R. Conrad, Ex. Gp.: 355

4,872,670, Re. S. N. 07/626,625, Filed Dec. 7, 1990, Cl. 272/134, APPARATUS FOR SQUAT EXERCISE, Raymond L. Nichols, Owner of Record: *Southern Xercise, Inc., Cleveland, Tenn.*, Attorney or Agent: Paul E. Hodges, Ex. Gp.: 332

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,799,745, Reexam. No. 90/002,223, Requested Dec. 6, 1990, Cl. 350/001.7, HEAT REFLECTING COMPOSITE FILMS AND GLAZING PRODUCTS CONTAINING THE SAME, Stephen F. Meyer, et al., Owner of Record: *Southwall Technologies, Inc., Palo Alto, Calif.*, Attorney or Agent: Irell & Mantella, Menlo Park, Calif., Ex. Gp.: 257, Requester: Owner

4,910,866, Reexam. No. 90/002,226, Requested Dec. 10, 1990, Cl. 036/044, SHOCK-ABSORBING INNERSOLE, James B. Sullivan, et al., Owner of Record: *Atlantic Thermoplastics Co., Inc., Hyannis, Mass*, Attorney or Agent: Richard P. Crowley, Osterville, Mass, Ex. Gp.: 244, Requester: Sorothane, Inc., Kent, Ohio

4,746,276, Reexam. No. 90/002,227, Requested Dec. 12, 1990, Cl. 417/295, GEAR PUMP HAVING CONDITIONAL DRY VALVE CLOSURE STRUCTURE, James R. McBurnett, et al., Owner of Record: *Dana Corp., Toledo, Ohio*, Attorney or Agent: Southwood J. Morcot, Dana Corp., Toledo, Ohio, Ex. Gp.: 343, Requester: Howard J. Rose, Bethesda, Md.

4,911,314, Reexam. No. 90/002,228, Requested Dec. 10, 1990, Cl. 215/228, STOPPER FOR A CONTAINER SUCH AS A BOTTLE, AND A PUMP CONNECTABLE THERETO FOR EXTRACTION OF GASEOUS MEDIUM FROM OR PUMPING IN THEREOF INTO THE CONTAINER, Bernardus J. J. A. Schneider, Owner of Record: *Inventor, Delft, The Netherlands,*

Attorney or Agent: Joseph Levinson, Parmalee, Bollinger & Bramblett, Stamford, Conn., Ex. Gp.: 241, Requester: Anthony R. Lemme, Wallingford, Conn.

4,892,244, Reexam. No. 90/002,229, Requested Nov. 27, 1990, Cl. 227/008, SURGICAL STAPLER CARTRIDGE LOCKOUT DEVICE, William D. Fox, et al., Owner of Record: *Ethicon, Inc., Somerville, N. J.*, Attorney or Agent: Robert L. Minier, Johnson & Johnson, New Brunswick, N. J., Ex. Gp.: 324, Requester: Owner

4,899,544, Reexam. No. 90/002,230, Requested Dec. 14, 1990, Cl. 060/618, COGENERATION/CO2 PRODUCTION PROCESS AND PLANT, Randell T. Boyd, Owner of Record: *Inventor, Sugar Land, Tex.*, Attorney or Agent: David L. Mosley, Dodge, Bush & Moseley, Houston, Tex., Ex. Gp.: 346, Requester: Victor M. Wigman, Wigman & Cohen, Arlington, Va.

Errata

"All reference to Patent No. 4,964,255 to Arthur C. Williams of Texas for `CEILING SYSTEM' appearing in the *Official Gazette* of October 23, 1990 should be deleted since no patent was granted."

All reference to Patent No. 4,965,505 to Frank D. McCaleb of Loxahatchee, Florida for 'LITHIUM BATTERY DEACTIVATOR' appearing in the *Official Gazette* of October 23, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,970,526 to Hisashi Fukushima et al. of Yokohama, Japan for `IMAGE PROCESSING APPARATUS' appearing in the *Official Gazette* of November 13, 1990 should be deleted since no patent was granted."

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Infina. Inc., Great Neck, N. Y., Reg. No. 1,440,406, for the mark "MOOD SCENTS", Canc. No. 19,178.

JEAN BROWN
Administrator, Trademark Trial and Appeal Board
For Jeffrey M. Samuels
Assistant Commissioner for Trademarks

REGISTRATION TO PRACTICE

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, eithical, or other grounds should be furnished to the Director, Office of Enrollment and Discipline on or before March 15, 1991.

Field, Paul J. 38 Dixington Crescent, #411, Weston, Ont., M9P 2K7, CANADA
Feldbaum, Ronald, P.O. Box 3170, Ann Arbor, Mich. 48106
Ledgley, Cynthia J., 280 Wellesley St., E., Suite 2719, Toronto, Ont., M4X 1G7, CANADA
Milne, Peter, 402 Riverside Dr., Oakville, Ont., L6K 3N7, CANADA
Sim, Keltie R., 14 Windsor Ave., Scarborough, Ont., M1N 1A7, CANADA

Dec. 27, 1990 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Seminar on International Cooperation and the Use of Computers in the Field of Trademarks

The Permanent Committee On Industrial Property Information (PCIPI) of the World Intellectual Property Organization is sponsoring a Seminar On International Cooperation And The Use Of Computers In The Field Of Trademarks. The Seminar will be hosted by the United States Patent and Trademark Office (USPTO) and will be held from May 27-31, 1991 at the Hyatt Regency Crystal City Hotel in Arlington, Virginia. The purpose of the Seminar is to exchange experiences in the use of computers in national trademark operations and to explore the possibilities in the field.

Over 70 countries and official observer organizations which are members of the PCIPI have been invited to participate. Many countries have volunteered to present papers describing their trademark automation activities and conduct demonstrations of automated trademark systenms. In addition, the USPTO will offer presentations, tours and demonstrations in regards to its automated trademark systems.

Actual participation in the Seminar is limited to PCIPI member countries and official observer organizations. However, others desiring to observe the proceedings on an unofficial, non-participatory basis, are welcome. Details concerning the Seminar will be provided to those expressing interest, including information about the availability of preferencial room rates at the Hyatt Regency Hotel.

There is no charge for the Seminar; but, since space is somewhat limited, only *preregistered* unofficial observers will be admitted. Those desiring to attend the Seminar sessions on an unofficial, non-participatory basis, must register with the USPTO as early as possible. Due to space limitations, late requests for registration may be refused. Requests for further information or registration should be directed to the USPTO at the address given below.

CONTACT:

Gary R. Robinson	Phone 703-557-6006
Seminar Coordinator	
Patent & Trademark Office	Telefax 703-557-6369
Box 4	
Washington, D.C. 20231	Telex 703-557-0671

JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Status of PTO Services

The following is an update of the status of PTO services for Dec. 1990:

Service Item	FY 1991 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	18
Trademarks	30	48
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	17 Hours
Window Coupons	5	2
Mail Coupons	12	4
Letter Orders	16	15
Electronic Ordering Service (EOS)	11	3
Certified Copies:		
Trademark Registrations	21	30
Applications-As-Filed	17	9
File-Wrapper/Contents	N/A	13
Walk-up Certification	1	1
Patent Application Expedited	5	3
Trademark Search Library:		
Filing Pending Marks	23	32
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	14
Assignments:		
Recording Patent-New Applications	20**	21
Recording Patent-Mail Room Recpts.	20	22
Return Patents-New Applications	34**	39
Return Patents-Mail Room Recpts.	34	38
Recording Trademarks	20	21
Returning Trademark Documents	34	32
Avg. Days from Issue Fee Payment to Issue Date	90-100	99
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	94% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

January 4, 1991

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

HELPFUL HINTS•*New Special PTO Mail Box*•A new special box, Box Sequence, has been established for the submission of biotechnology applications with a computer diskette.

The following is a complete list of all the special boxes which can be used to ensure the timely and effective processing of the particular document for which the special box is designated. *Please note that the envelope addressed to a particular special box should only contain the document(s) for that particular box.* If a document other than the type designated for that special box is included in the envelope, processing of the extra document may be delayed.

List of Special Boxes

Address to:

Box ————
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Washington, DC 20231

Box 3	Mail for the Office of personel for NFC
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs.
Box 5	"No Fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 14	Invoices directed to the Office of Finance.
Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 171	Vacancy Announcement Applications.
Box 200	Mail related to PTO's Bicentennial celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box Assignment	All assignment documents except those filed with new applications.
Box EEO	Mail for the Office of Equal Employment Programs.
Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62)
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
Box ITU	All intent to use documents, excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non-Fee-Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline
Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Requests for Reexamination for *original* request papers *only*.
Box Sequence	Submission of diskette for biotechnical application.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").

•*Receipt for National Stage Papers Filed in the International Division as a Designated/Elected Office*

If a receipt and notification of a serial number for a national stage application is desired, it is suggested that two(2) seperate postcards be submitted to the International Division as a Designated/Elected Office. The International Division will stamp and return one postcard as a receipt, verifying the date the papers were deposited in the Division. The other postcard will be returned once the national stage serial number has been assigned.

It is strongly recommended that the receipt postcard include a detailed itemization of what is submitted (MPEP 503). The identifying data should be so complete as to match the papers with the international application or other documents with which they are to be associated; for example, the international application number, filing date, title, file reference number, number of pages to the specification, claims, abstract, drawings, and type of papers, such as national stage application papers, petition, amendments, etc.

January 4, 1991

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of January 29, 1991

D. 302,223	4,856,133	4,882,878	4,892,476
D. 302,767	4,857,216	4,883,098	4,894,190
Re. 32,857	4,858,921	4,883,407	4,894,259
Re. 32,900	4,859,714	4,883,673	4,894,856
Re. 33,278	4,859,745	4,884,839	4,895,706
4,696,770	4,860,318	4,884,851	4,896,123
4,731,816	4,861,000	4,884,911	4,896,225
4,740,262	4,861,567	4,885,753	4,896,335
4,754,125	4,865,429	4,886,544	4,896,666
4,752,854	4,866,118	4,886,925	4,897,032
4,755,468	4,867,174	4,887,185	4,898,739
4,755,509	4,867,919	4,887,492	4,899,200
4,770,626	4,868,853	4,887,788	4,899,230
4,793,758	4,869,572	4,888,225	4,899,880
4,808,584	4,869,739	4,888,333	4,989,918
4,821,096	4,870,282	4,888,394	4,900,003
4,827,520	4,870,411	4,888,843	4,900,640
4,828,381	4,870,708	4,888,963	4,900,781
4,829,997	4,873,757	4,889,205	4,900,948
4,830,045	4,874,534	4,889,400	4,902,286
4,830,444	4,875,084	4,889,750	4,902,510
4,833,706	4,875,655	4,890,585	4,907,912
4,836,858	4,876,021	4,890,624	4,912,167
4,839,583	4,876,966	4,890,825	4,921,025
4,846,879	4,879,918	4,890,921	4,921,865
4,848,417	4,880,203	4,891,002	4,946,869
4,853,854	4,880,301	4,891,197	4,948,986
4,854,195	4,880,799	4,891,263	
4,854,309	4,881,196	4,891,437	
4,855,473	4,882,082	4,891,444	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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Washington, D.C. 20231

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Box 14	Invoices directed to the Office of Finance.
Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 171	Vacancy Announcement Applications.
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Box Pat. Ext.	Applications for patent term extension.
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Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 823-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	Not Yet Operational
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 405-9157
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	Not Yet Operational
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF December 29, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	12-4-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	4-24-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	2-27-89
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-31-89
BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director	3-21-88
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	3-28-89
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	3-17-89
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	9-19-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	8-14-89
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director.	4-24-89
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	1-30-89
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	7-1-87
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	12-7-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director	5-11-89
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	7-24-89
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	7-6-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	1-2-90

Expiration of patents: The patents within the range of numbers indicated below expire during December 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,775,774 to 3,778,913 inclusive
Plant Patents ..... none

ERRATA

Jan. 22, 1991 folios stop on page 2433.

Jan. 29, 1991 folios begin on page 2505.

REEXAMINATIONS

JANUARY 29, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,756,328 (1407th)
PNEUMATICALLY OPERATED IMPACT-ACTION SELF-PROPELLED MECHANISM

Boris V. Sudnishnikov; Alexander D. Kostylve; Konstantin S. Gurkov; Konstantin K. Tupitsin; Vladimir V. Klimashko, all of Novosibirsk; Viktor E. Solomko, Odessa; Alexandr N. Reinsburg, Odessa, and Moisei L. Yampolsky, Odessa, all of U.S.S.R., assignors to Institut Gorngo Dela Siberskogo, Odessa, U.S.S.R.

Reexamination Request Nos. 90/001,771, May 15, 1989 and 90/001,824, Aug. 14, 1989.

Reexamination Certificate for Patent No. 3,756,328, issued Sep. 4, 1973, Ser. No. 228,601, Feb. 23, 1972.

Continuation-in-part of Ser. No. 72,723, Sep. 15, 1970, abandoned. This application Aug. 14, 1989, Ser. No. 228,601

Int. Cl.[5] E21B *11/00*

U.S. Cl. 173—91

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **4, 5, 6, 7** and **8** is confirmed.

Claims **1, 2,** and **3** are cancelled.

[1. A pneumatically-operated impact-action self-propelled mechanism for driving holes in the earth by compacting the soil about the hole being made, comprising, in combination, a housing with a front end portion; means for supplying air; a sleeve mounted in the rear end portion of said housing for communicating with said means for supplying compressed air; an impact member for reciprocating inside said housing and delivering impacts in the direction of the front end portion of said housing in the course of a hole making, said impact member forming together with said housing a front chamber of a variable volume and together with said sleeve a rear chamber of a variable volume; said sleeve sealingly entering said impact member for relative sliding movement and functioning to pass compressed air into said chambers to effect reciprocation of said impact member; passages in said impact member for alternately communicating said front chamber with said rear chamber and atmosphere when the position of the impact member changes relative to said sleeve; and a resilient shock-damping means inside the rear end portion of said housing and having longitudinal passages for air pass from said front chamber into the atmosphere, said sleeve being mounted inside said shock-damping means.]

4. A pneumatically-operated mechanism according to claim **1**, including means on said sleeve for changing the mode of operation of said impact member so that the housing is driven rearwardly.

B1 4,045,841 (1408th)
HINGE

Erich Röck, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum, Inc., Stanley, N.C.

Reexamination Request No. 90/001,928, Jan. 31, 1990.

Reexamination Certificate for Patent No. 4,045,841, issued Sep. 6, 1977, Ser. No. 673,893, Apr. 5, 1976.

Filed Jan. 31, 1990, Ser. No. 673,893

Claims priority, application Austria, Apr. 7, 1975, 2623/75; Dec. 2, 1975, 9174/75

Int. Cl.[5] E05D *7/04, 7/12*

U.S. Cl. 16—238

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–9** and **12–18** is confirmed.

Claims **10–11** are cancelled.

New claims renumbered **19–43** are added and determined to be patentable.

1. A hinge arrangement comprising, in combination, a base plate attachable to furniture means; a hinge arm carrying toggle joint means and being anchorable in said base plate; said toggle joint means having pivot means; said hinge arm having means for mounting said pivot means at one end of said hinge arm; said hinge arm having a longitudinal slot at another end of said hinge arm spaced from said mounting means for said pivot means of said toggle joint means; screw means passing through said slot and carried in said base plate; said hinge arm including a holding shoulder between said longitudinal slot and said mounting means for said pivot means; projecting means on said base plate, said holding shoulder gripping behind said projection means on said base plate.

B1 4,183,018 (1409th)
MOTOR DRIVEN TYPE GONG STRIKING MECHANISM

Mitsuo Sakaguchi, Tokyo, Japan

Reexamination Request No. 90/002,018, May 7, 1990.

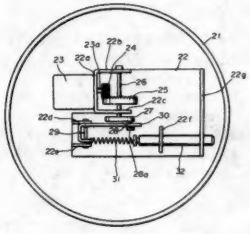
Reexamination Certificate for Patent No. 4,183,018, issued Jan. 8, 1980, Ser. No. 891,601, Mar. 30, 1978.

Filed May 7, 1990, Ser. No. 891,601

Claims priority, application Japan, Dec. 6, 1977, 52-163630; Dec. 6, 1977, 52-163631

Int. Cl.[5] G10K *1/064*

U.S. Cl. 340—396



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–8** is confirmed.

1. A motor driving type gong striking mechanism, which comprises:

a driving electric motor a driving electric motor mounted on a frame within a gong;

a piston plate supported on the frame and adapted to pivotally move back and forth in a substantially oscillatory motion from a first position to a second position and then back to the first position in accordance with the rotation of the main shaft of said electric motor;

a pivotally movable transmission means for directly and continuously transmitting the rotation of the motor to said piston plate;

a hammer;

the gong spaced from the hammer and adapted to be struck by the hammer;

support means on the frame for supporting the hammer for oscillation;

spring means coupling the hammer to the piston plate for biasing and releasing such bias in response to oscillation of the piston plate to thereby cause oscillation of the hammer and cause the gong to be struck thereby.

B1 4,550,059 (1410th)

METHOD OF FORMING A TINTABLE ABRASION-RESISTANT COATING ON A SUBSTRATE AND ARTICLE PRODUCED THEREBY

Jeffrey L. Dalton, Grovenordale, Conn., and Philip M. Johnson, Southbridge, Mass., assignors to Gentex Optics, Inc.

Reexamination Request No. 90/001,941, Feb. 15, 1990.
Reexamination Certificate for Patent No. 4,550,059, issued Oct. 29, 1985, Ser. No. 520,459, Aug. 4, 1983.
Filed Feb. 15, 1990, Ser. No. 520,459
Int. Cl.[5] B05D *3/06*
U.S. Cl. 428—409

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1**, **8**, **12**, and **22** are cancelled.

Claims **2–7**, **9–11**, **13–21**, and **23–27** are determined to be patentable as amended.

New Claims **28**, **29** are added and determined to be patentable.

5. A method [as in claim **1** in which] *of forming a tintable abrasion-resistant coating on an optical substrate including the steps of applying a radiation-curable optically transparent abrasion-resistant coating to the surface of said substrate, partially curing said applied coating by exposure to radiation, and terminating said exposure to radiation while said coating is in such a stage of partial cure that it remains tintable,* said coating [includes] *including* a triacrylate or tetracylate monomer and a monomer containing an N-vinyl imido group.

B1 4,725,664 (1411th)

IMPACT MODIFIED POLYESTER

C. B. Halmess, Kleberg, and Lindsey C. Deal, Nueces, both of Tex., assignors to Celanese Corporation

Reexamination Request No. 90/001,944, Feb. 22, 1990.
Reexamination Certificate for Patent No. 4,725,664, issued Feb. 16, 1988, Ser. No. 889,053, Jul. 22, 1986.
Filed Feb. 22, 1990, Ser. No. 889,053
Int. Cl.[5] C08G *63/60*
U.S. Cl. 528—176

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–12** are cancelled.

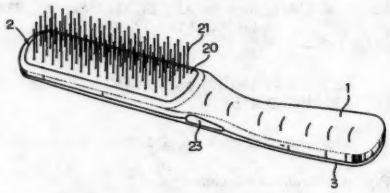
[**1**. A moldable copolyester prepared from the reaction of terephthalic acid or an ester derivative thereof with a diol component comprising a mixture of **1,4** butanediol and an alkoxylated, nonhalogenated bisphenol A.]

B1 4,797,966 (1412th)

ANTI-ELECTROSTATIC BRUSH

James C. Fong, Taipei, Taiwan, assignor to Tong-Fong Brush Factory Co., Ltd.

Reexamination Request No. 90/002,020, May 10, 1990.
Reexamination Certificate for Patent No. 4,797,966, issued Jan. 17, 1989, Ser. No. 63,890, Jun. 19, 1987.
Filed May 10, 1990, Ser. No. 63,890
Int. Cl.[5] A46B *9/08*
U.S. Cl. 15—186



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–15** is confirmed.

1. An anti-electrostatic brush comprising:

an electrically conductive bristle receiving means receiving a plurality of bristles thereon, said bristle receiving means being provided with a contact part;

a first housing part having a first opening at one end thereof and a first handle portion at the other end thereof, said first opening being slightly smaller than said bristle receiving means, said first housing part being provided with a first engagement means; and

a second housing part having a means for receiving said bristle receiving means at one end thereof and a second handle portion at the other end thereof, said second housing part being provided with a second engagement means to be engaged with said first engagement means securing the first and second housing parts together, wherein at least one of first and second housing parts has a second opening at the handle portion thereof, through which second opening said contact part of said bristle receiving means is exposed to the surface of said handle portion.

REISSUES

JANUARY 29, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

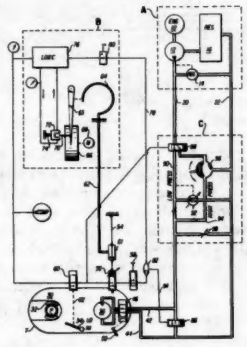
Re. 33,526
POWER TONGS AND CONTROL SYSTEM

William E. Coyle, Sr., Houma, La., assignor to Bilco Tools, Inc., Houma, La.

Original No. 4,579,024, dated Apr. 1, 1986, Ser. No. 629,421, Jul. 10, 1984. Continuation of Ser. No. 41,061, Apr. 22, 1987, abandoned. Application for reissue Jun. 14, 1989, Ser. No. 376,211

Int. Cl.[5] B25B *23/15*

U.S. Cl. 81—470 6 Claims



1. A control system for a power tongs comprising a snub line for restraining the tongs,

a first snub line tension transducer for generating signals proportional to tongs torque in the hand-tight range,

a second snub line tension transducer for generating signals proportional to tongs torque in the full makeup torque range,

first means responsive to said first transducer for halting tongs operation at a preset hand-tight torque level,

second means responsive to said second transducer for halting tongs operation at a preset full makeup torque level, and

means for disabling said first means.

Re. 33,527
TRASH COMPACTOR

Anthony Fox, Minneapolis, Minn., assignor to TFC Corporation, Minneapolis, Minn.

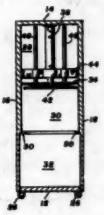
Original No. 4,152,035, dated May 1, 1979, Ser. No. 867,131, Jan. 5, 1978. Application for reissue Nov. 9, 1989, Ser. No. 433,973

Int. Cl.[5] B30B *15/06, 15/04*

U.S. Cl. 100—53 7 Claims

1. A cabinet for a trash compactor of the type including a frame defining a generally rectangular parallelepiped and having a base and top panel separated by two generally rectangular side panels and a rear panel, each having an inner and an outer planar surface, said panels being attached to said frame, said cabinet being functionally partitioned vertically into three separate compartments including an upper machinery containing compartment, an intermediate trash receiving compartment and a lower trash compacting compartment, *and said compactor being of the type having a generally planar, horizontally disposed compaction plate mounted for upward and downward movement within said trash receiving and trash compacting compartments, said plate having peripheral edges in inwardly spaced relation to said inner planar surface of said side and rear panels within said trash receiving and trash compacting compartments,* the improvement comprising:

(a) an inwardly extending planar recess formed in the inner surface of *each of* said side and rear panels [in the area] of said trash compacting compartment, said [recess] *recesses* being of a predetermined depth such that when a box-type container having vertical side walls of a predetermined thickness is inserted into said trash compacting



compartment, at least three of said vertical side walls of said container are wholly contained within said recesses *and said recesses defining a stripping edge at the juncture between said trash receiving and trash compacting compartments, whereby items of trash caught on said peripheral edges of said planar compaction plate will be stripped therefrom by said stripping edge as said compaction plate moves upwardly from said trash compacting compartment into said trash receiving compartment.*

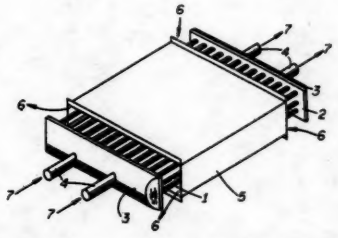
Re. 33,528
MICROTUBE-STRIP HEAT EXCHANGER

F. David Doty, 701 Burmaster Dr., Columbia, S.C. 29223-4315

Original No. 4,676,305, dated Jun. 30, 1987, Ser. No. 700,125, Feb. 11, 1985. Continuation of Ser. No. 243,048, Sep. 9, 1988, abandoned. Application for reissue Jun. 23, 1989, Ser. No. 371,663

Int. Cl.[5] F28F *9/02*

U.S. Cl. 165—158 17 Claims



1. A gas-gas laminar-flow heat exchanger module which comprises:

a plurality of heat transfer augmentation-free corrosion resistant, precision, hardened, metallic tubes [arrayed in at least four parallel disposed planar rows of at least forty tubes per row] *arrayed in a plurality of rows of tubes;*

a first rectangular header strip interference press fit and diffusion welded to one end of each of said tubes;

a second rectangular header strip interference press fit and diffusion welded to the other end of each of said tubes;

first manifold means metallurgically connected to said first rectangular header strip for defining a gas inlet flow path into said one end of each of said tubes;

second manifold means metallurgically connected to said second rectangular header strip for defining a gas outlet flow path from said other end of each of said tubes;

means disposed externally of said tubes for defining a counterflow flow-path of heat exchanger gas over substantially the entire length of the external surfaces of each of said tubes from within the vicinity of said other end of each of said tubes to within the vicinity of said one end of each of said tubes;

each of said tubes having an outside diameter of less than 3 mm;

each of said tubes having a length which is sufficient to allow for fully developed laminar flow and which is less than 300 times and outside diameter of each of said tubes; and

said plurality of tubes within each of said rows being laterally spaced by a center-to-center distance of from 1.3 to 2.8 times the outside diameter of each of said tubes.

Re. 33,529

COVERING FOR WALL, CEILING OR FLOOR LININGS

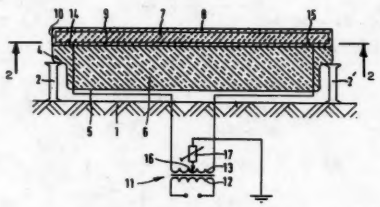
Gottfried Cremer, Cologne, and Martin Bard, Amberg, both of Fed. Rep. of Germany, assignors to Buchtal Gesellschaft mit beschrankter Haftung, Schwarzentfeld Opf, Fed. Rep. of Germany

Original No. 4,839,500, dated Jun. 13, 1989, Ser. No. 10,510, Feb. 3, 1987. Application for reissue Feb. 15, 1990, Ser. No. 480,921

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1986, 3603233

Int. Cl.[5] H05B *3/26*

U.S. Cl. 219—213 **18 Claims**



1. A covering structure adapted for a double wall, ceiling or floor construction comprising a plurality of elements bedded directly or indirectly on supports disposed at predetermined intervals on a stable substructure, with each element being a compound covering element that, on its visible side, has a ceramic tile with a visible surface and a back surface, that has an electrically conductive glaze on the back surface of the ceramic tile which is adapted to be electrically charged whereby the ceramic tile is heated and that has means for dissipating static electricity.

PLANT PATENTS

GRANTED JANUARY 29, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,430
MINIATURE ROSE PLANT NAMED INTERGOL

G. P. Ilsink, Leersum, Netherlands, assignor to Interflant B.V., Leersum, Netherlands

Filed Aug. 11, 1989, Ser. No. 392,577
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—8 **1 Claim**

1. A new and distinct variety of rose plant of the miniature rose class, substantially as shown and described, characterized particularly by a plant suitable for growing in pots and outdoor in gardens and by attractive deep yellow flowers which are long lasting on the plant.

7,431
PLUM-APRICOT HYBRID TREE (ROYAL VELVET PLUM-COT)

Norman G. Bradford, 11875 E. Savana Rd., and Lowell G. Bradford, 12439 E. Savana Rd., both of Le Grand, Calif. 95333

Filed Dec. 28, 1989, Ser. No. 458,570
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum-apricot hybrid tree, substantially as illustrated and described, that most closely resembles the Red Velvet Plum-cot (U.S. Plant Pat. No. 7,011) by being self-sterile and by producing dark purplish red fruit that has skin pubescence, that is clingstone in type, and that is firm enough for commercial shipping, but is distinguished therefrom and an improvement thereon by having wood that is less brittle and by producing fruit that is globose in shape instead of oblong, much sweeter in flavor at shipping ripeness, more strongly attached to the stem, and 5 days later in maturing.

7,432
PEACH TREE (RICH MAY)

Chris F. Zaiger, 537 Rosemore Ave.; Leith M. Gardner, 1207 Grimes Ave.; Gary N. Zaiger, 1907 Elm Ave., and Grant G. Zaiger, 4005 California Ave., all of Modesto, Calif. 95351

Filed Jan. 8, 1990, Ser. No. 462,091
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree as illustrated and described, characterized by its large size, vigorous upright growth and a regular and productive bearer of large size early maturing, yellow flesh, clingstone fruit with good eating, shipping and storage quality; the fruit is further characterized in comparison to the variety May Crest Peach (U.S. Plant Pat. No. 4,064) as maturing 4 to 5 days earlier with heavier production of larger size fruit.

7,433
MAPLE TREE NAMED 'WARRENRED'

Keith S. Warren, Gresham, Oreg., assignor to J. Frank Schmidt & Son Co., Boring, Oreg.

Filed Jan. 5, 1990, Ser. No. 461,258
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of *Acer truncatum* tree, substantially as herein shown and described, characterized particularly as to novelty by its rapid rate of growth, its very straight trunk, and branches of one year trees which are extremely symmetrical; and a brilliant red to greyed purple fall color.

7,434
CHRYSANTHEMUM PLANT NAMED SONRISA

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Nov. 14, 1989, Ser. No. 435,824
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Sonrisa, as described and illustrated.

7,435
CHRYSANTHEMUM PLANT NAMED PAPILLON

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Nov. 14, 1989, Ser. No. 435,825
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Papillon, as described and illustrated.

PATENTS

GRANTED JAN. 29, 1991

ERRATA

For CLASS	See PATENT NO.
081-008	4,987,821
123-467	4,987,887
123-488	4,987,888
123-492	4,987,889
123-492	4,987,890
606-061	4,987,892
383-074	4,988,216
366-285	4,988,303
166-302	4,988,389
264-518	4,988,477
264-518	4,988,428
426-595	4,988,590
562-575	4,988,789
524-514	4,988,790
546-222	4,988,817
392-363	4,988,847
340-825	4,989,022

PATENTS

GRANTED JANUARY 29, 1991

GENERAL AND MECHANICAL

4,987,608

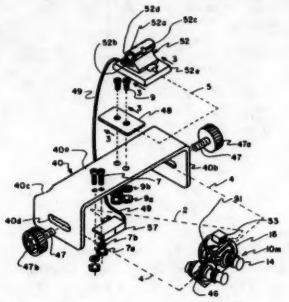
MOUNTING MEANS FOR USE OF GROUND SYSTEM TYPE GOGGLES AS AVIATORS GOGGLE

Bernard A. Cobb, Tucson, Ariz., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 213,820, Jun. 30, 1988, abandoned. This application Sep. 13, 1989, Ser. No. 406,490

Int. Cl.[5] A42B *3/02, 1/24*

U.S. Cl. 2—6 **8 Claims**



1. An adapter for coupling a pair of ground system, AN/PVS-5, night vision goggles, having threadable engagement means on both sides thereof, to an ANVIS helmet visor having attached thereto a cylindrical flip up mount with a stationary support means containing an elongated cylindrical opening in which a cylindrical rotatable member may be rotatably inserted for effecting rotational flip up capability for the goggles, wherein said adapter comprises:

bracket means for coupling the goggles to said cylindrical rotatable member;

adjustment means for aligning and adjusting the distance between a users eyes and the goggles;

wherein said bracket means is further composed of a lightweight rigid material of a generally rectangular shape with a tab extension, having a slot therein, extending perpendicularly from each end thereof, whereby the bracket may be placed over the goggles with the tab extensions extending down along side the goggles for aligning the slots in the tabs with said threadable engagement means on each side of the goggles, wherein said adjustment and aligning means further comprises a screw mechanism slidably engaged in the slots of each respective bracket tab and threadably engaged with the threadably engagement means of the goggles to effect the proper alignment of the goggles to a users eyes.

4,987,609

MILITARY SAFETY HELMET

Christian Zahan, Am Buelten 40, 3300 Braunschweig, Fed. Rep. of Germany, Assignee: Schuberth-werk GmbH & Co., KG, Federal Republic of Germany

Filed Oct. 24, 1989, Ser. No. 425,723

Int. Cl.[5] A42B *3/00;* **A62B** *18/00*

U.S. Cl. 2—6 **18 Claims**

1. An internal band arrangement forming a supporting basket for a military safety helmet with an outer cap resistant to bombardments, comprising:

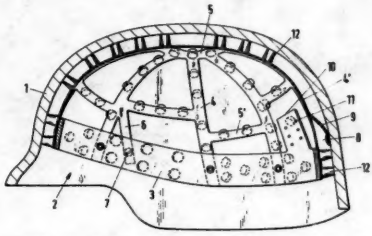
(a) an encircling annular supporting band;

(b) a plurality of bands extending in a radiating manner from a central fastening piece adapted to be located near the top of said helmet, the ends of said radiating bands being connected to said supporting band;

(c) at least one band connecting adjacent members of pairs of said adjacent radiating bands;

(d) bosses formed on said supporting band and said radiating bands so as to point towards an inner face of said helmet cap, the radiating bands having a width substantially the same as said bosses; and

(e) means, including three fastening strips extending from at



least some of said radiating bands, for firmly connecting said internal band arrangement to said helmet cap so that said band arrangement rests against the inner face of said helmet cap via at least some of said bosses to form a supporting basket, wherein two of said fastening strips are arranged laterally corresponding to a front region of the helmet cap and one of said fastening strips is arranged centrally corresponding a rear region of the helmet.

4,987,610

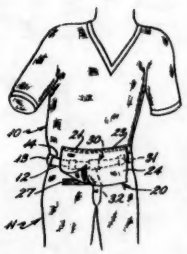
SLIDE GARMENT FOR ATHLETIC UNIFORMS

William J. Hunt, 2410 Kingsley Dr., Macon, Ga. 31204

Filed May 31, 1989, Ser. No. 359,694

Int. Cl.[5] A41B *1/00, 1/18*

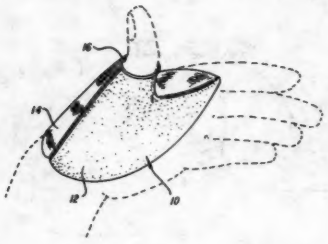
U.S. Cl. 2—46 **11 Claims**



1. In an athletic uniform having a combination jersey and pants wherein the jersey includes a lower tail portion and the pants include a waist portion and wherein the jersey and pants include front portions and spaced side portions, the improvement comprising a fabric flap, said fabric flap having upper and lower edges and a pair of spaced side edges, securing means for continuously sealing substantially the entire upper edge of said fabric flap to the jersey so that said upper edge of said flap is secured in spaced relationship with respect to said lower tail portion of the jersey, said lower edge of said fabric flap being moveable with respect to the front portion of the jersey when said upper edge is secured thereto, said fabric flap being of a length when measured between said upper and lower edges thereof so as to extend over the waist portion of the pants when the uniform is being worn with the lower tail portion of the jersey tucked into the pants, and said fabric flap extending substantially between the side portions of the jersey whereby

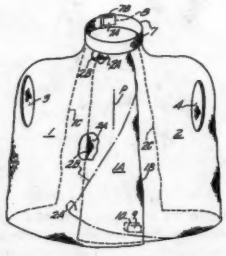
said fabric flap extends over the waist portion of the pants when the uniform is being worn to thereby prevent material from passing between the jersey and pants.

4,987,611
PROTECTIVE DEVICE FOR BASEBALL PLAYER
Franklin H. Maye, 3143 Omega Ave., Simi Valley, Calif. 93063
Filed Jul. 28, 1989, Ser. No. 386,270
Int. Cl.[5] A41D *13/08*
U.S. Cl. 2—19 3 Claims



1. A protective device to be worn on the hand and under the glove of a ball player constructed to be put on over the hand of a user without the hand passing through the device, said device including: a padded front panel and a back panel, both of said panels being substantially triangular in shape and having joined rectilinear side and top edges and unattached arcuate bottom edges, said side and top edges forming an opening for receiving the thumb of the user, and the front and back panels respectively covering the palm and back of the hand of the user without completely encircling the hand.

4,987,612
CAPE FOR A NURSING MOTHER
Teresa L. Middleton, 2134 SE. Ohio, Rosenburg, Oreg. 97470
Filed Feb. 26, 1990, Ser. No. 484,269
Int. Cl.[5] A41D *1/20, 3/08;* A41B *9/00*
U.S. Cl. 2—104 6 Claims

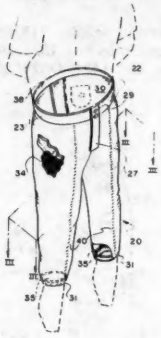


1. A cape for wear during the nursing of an infant in public, said cape comprising,

a neckband adapted for securement about the neck, and

pliable members integral with the neckband each having front and side portions for overlying the upper torso of the wearer, said members each defining an arm hole, said pliable members having mutually overlapping frontal portions extending substantially the length of the cape, said pliable members additionally including back portions which when the cape is worn terminate in horizontally spaced apart upright edges to facilitate both donning and removal of the cape.

4,987,613
ALL-IN-ONE SLIDER SPORT PANTS
Angela M. Loverdi, and Charles T. Loverdi, both of 117 Burton Rd. East, Sharon Hill, Pa. 19079
Filed Feb. 1, 1990, Ser. No. 473,613
Int. Cl.[5] A41D *13/00, 13/06*
U.S. Cl. 2—23 10 Claims



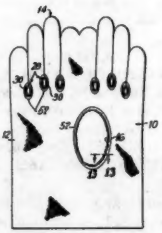
1. A utility garment for a sports player that protects the legs, hips and buttocks of the player from friction or contusion injuries caused when sliding into a base, comprising:

an outer garment layer, conforming substantially to the shape of trousers with waist, buttock, hip and leg portions, having waistband means for enclosing a player's waist;

padding layer means extending from approximately halfway to approximately three-quarters around the inner surface of said outer garment layer at the outer, circumferential half of each leg portion, substantially conforming, in shape, to the contour of the outer garment layer, and affixed to the inner surface of said outer garment layer; and,

an inner layer lining, to be adjacent the player and substantially conforming, in peripheral shape, to the contour of said padding layer means, affixed along the periphery of said padding layer means and said inner lining to said outer garment layer.

4,987,614
REINFORCED GLOVE FOR INHIBITING RUNS
Stongwater Murray, 326 Hewlett Neck Rd., Woodmere, N.Y. 11598
Filed Apr. 19, 1990, Ser. No. 511,073
Int. Cl.[5] A41D *19/02*
U.S. Cl. 2—163 10 Claims



1. In a glove construction of the type wherein a die cut trank is provided with mirror symmetrical body portions having integral upwardly extending finger stall forming portions adapted to be secured together with a fourchette therebetween, the improvement comprising reinforcing means for

inhibiting the formation of runs in said body portions, said reinforcing means being applied to said finger stall forming portions adjacent the peripheral edge thereof in the crotch region of the glove for an extent which is less than the entire peripheral contour of the stall forming portion said reinforcing means being U-shaped with the legs of the U being positioned in adjacent finger stalls and the base of the U being in the crotch between said two adjacent finger stalls.

4,987,615

METHOD OF CONSTRUCTING HUMAN-LIKE COSTUME HEADS

Judy E. Massey, 7217 Twin Lakes La., Pensacola, Fla. 32514

Filed Sep. 8, 1988, Ser. No. 242,024

Int. Cl.[5] A42B *1/00*

U.S. Cl. 2—206 **5 Claims**

1. An enlarged life-like human costume head comprising:

(a) a body of foam material having an outer sculpted surface formed by cutting with at least a facial surface area with features resembling a human head, the body being substantially larger in size than a human head so that it can be worn by an individual user;

(b) a painted layer applied to the outer sculpted surface of the foam for coloring one or more facial features of the facial surface area with multiple contrasting colors; and

(c) a thin sealing layer that coats the foam body at least in the facial surface area to seal the foam but being sufficiently thin that the texture of the foam can be felt, resembling a skin-like feeling.

4,987,616

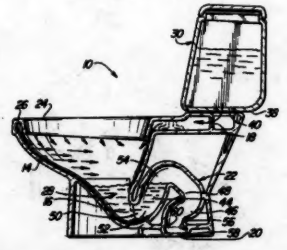
WATER SAVER WATER CLOSET

Myron J. Ament, Plano, Tex., assignor to Eljer Manufacturing, Inc., Plano, Tex.

Filed Oct. 13, 1988, Ser. No. 256,992

Int. Cl.[5] E03D *11/08, 11/18*

U.S. Cl. 4—421 **20 Claims**



1. In a water saver closet of the type including an upwardly open and downwardly converging bowl for receiving flush water and waste, and a siphon trap for communicating said water and waste from said bowl to a discharge opening, said trap comprising a continuous generally cylindrical inverted U-shaped passageway including an upleg connected to the bowl outlet, a downleg connected to the discharging opening, and an axially elongated transition leg connecting the upleg to the downleg, said U-shaped passageway axis of flow being on the same substantially vertical plane, said upleg having a first and second portion with said first portion being connected to said outlet and having a cross-section that is less than the cross-section of each said second portion and said bowl outlet whereby to define an orifice between the bowl and said transition, said downleg having a first cross-section that is less than the cross-section of said upleg second portion, and means, including a water feed rim adjacent the top of the bowl, for producing a swirling vortex movement of the flush water within the bowl whereby to cause the waste to enter the upleg prior to the entrance of the flush water into the upleg, each said leg being at an acute to a horizontal plane from said vertical plane.

4,987,617

NOZZLE MECHANISM IN A SANITARY DEVICE

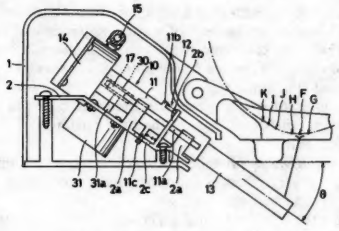
Hideki Furukawa, Toyota, and Yuji Yamaguchi, Anjo, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

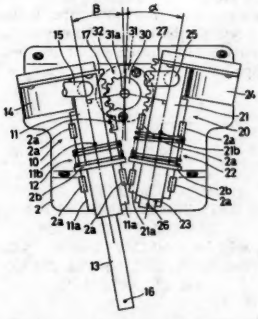
Filed Feb. 9, 1990, Ser. No. 477,736

Claims priority, application Japan, Mar. 16, 1989, 1-64575; Mar. 16, 1989, 1-64576

Int. Cl.[5] A61H *35/00*

U.S. Cl. 4—448 **4 Claims**





1. A nozzle mechanism of a sanitary device for selectively washing either the anus or the bidet portion of a user, comprising:

a plate fixedly mounted on a rear end portion of a toilet bowl;

a first cylinder mounted on the plate so as to be movable towards the interior of the toilet bowl;

a first pipe mounted in the first cylinder so as to be movable with the first cylinder in the axial direction thereof;

first driving means for moving the first pipe;

a second cylinder mounted on the plate so as to be movable

towards the interior of the toilet bowl and making an angle with respect to the first cylinder;

a second pipe mounted in the second cylinder so as to be movable with the second cylinder in the axial direction thereof;

second driving means for moving the second pipe; and

common mechanical driving means selectively movable into engagement with a drive portion of either of said first or second cylinders for selectively and independently driving the first cylinder or the second cylinder towards the interior of the toilet bowl, whereby either of said cylinders is driven by the common driving means, whereby the first and second cylinders may be driven to selectively wash either the anus or the bidet portion of the user.

4,987,618

HAIR RINSING DEVICE

Linda D. Tolbert, #7 Londonberry Square, Cayce, S.C. 29033

Filed Dec. 29, 1989, Ser. No. 459,202

Int. Cl.[5] A45D *19/00*

U.S. Cl. 4—515 **8 Claims**

1. A hair rinsing device comprising,

a flexible convex outer cover including a central opening defined by a first perimeter rim wherein the outer cover is selectively securable to a flexible convex inner covering including a further central opening defined by a second perimeter rim,

and

the outer cover formed of a fluid impermeable material with the inner cover formed of a fluid impermeable material and wherein the inner cover further includes a matrix of fluid openings formed in the inner cover spaced from the second rim, and

a fluid inlet integrally secured to the outer cover to receive fluid and direct the fluid to the fluid openings of the inner cover, and

including a water chamber defined between the inner and outer cover, wherein the inner and outer cover are secured together, and

wherein the first rim includes a continuous trapezoidal channel formed within a bottom surface of the first rim, and the second rim includes a trapezoidal rib extending upwardly and orthogonally relative to an upper surface of the second rim to enable the trapezoidal channel to receive the trapezoidal rib for securement of the first and second covers together.

4,987,619

MODULAR BATHING CABINET AND METHOD OF FABRICATING SAME

Lee A. Smith, 3901 Foxcroft Rd., Charlotte, N.C. 28211

Filed Sep. 7, 1988, Ser. No. 241,332

Int. Cl.[5] A47K *3/22*

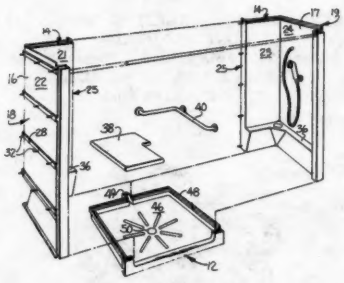
U.S. Cl. 4—612 **20 Claims**

1. A modular bathing cabinet which is adapted to be transported in a disassembled condition and assembled at the location of final installation and use, and comprising

a horizontally disposed base having a generally rectangular outer periphery in plan view, and including an aperture for receiving a drain,

an enclosure of generally U-shape in horizontal cross-section and having a vertical back wall, opposite vertical side walls, and an open front, with said enclosure being positioned upon the outer periphery of said base and extending vertically upwardly therefrom, and with said enclosure comprising a plurality of upright side sections which are positioned in an adjacent side by side arrangement and define a vertical junction line between each adjacent pair, each of said upright side sections including an integral outwardly extending flange along each adjacent vertical junction line, with the flanges of adjacent side sections being parallel to and overlying each other, and

a plurality of rigid reinforcing straps affixed to each of said



upright side sections and disposed along the outside surface of each of said upright side sections, with said reinforcing straps of each side section extending horizontally and in a vertically spaced apart arrangement, and with each reinforcing strap of each side section being horizontally aligned with a respective one of the reinforcing straps of each adjacent side section, and means interconnecting the horizontally aligned straps across each vertical junction line and so as to press the overlying flanges toward each other, and so as to define a plurality of horizontal reinforcing bands which extend continuously along the back wall and both side walls of said enclosure, each of said reinforcing straps further including a plurality of securing members connected to and extending outwardly therefrom and adapted to be engaged with and secured to a building wall stud or the like.

4,987,620

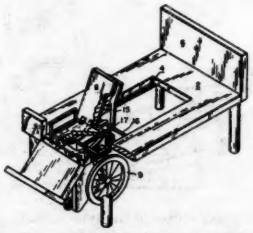
COMBINED BED AND WHEELCHAIR

Benjamin Sharon, 6 Kipnis Street, Rehovot, Israel

Filed Oct. 3, 1989, Ser. No. 416,426

Int. Cl.[5] A61G *7/00*

U.S. Cl. 5—60 **12 Claims**



1. A bed for use by invalids and incapacitated persons comprising: a bed frame and a mattress, the said mattress and bed frame having complementary cut-out areas, an insert comprising a multiple number of upholstered parts which are hingedly

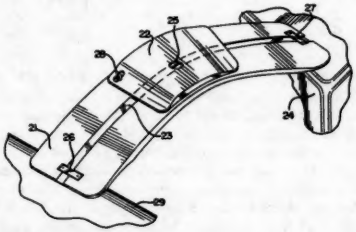
connected with one another, said insert when its parts are made to be in a common plane, fitting in and substantially filling said cut-out area and forming part of the mattress surface, the said hingedly connected parts extending in succession to each other from near a head part of the bed to, and including an opposite foot part of the bed, wheels functionally connected to at least one of said insert parts, said insert being removable from the frame, and means a means disposed on said bed frame and cooperating with said insert for automatically transforming said insert into a chair as said insert is removed from the frame.

4,987,621

SLIDING TRANSFER DEVICE

Robert F. Brantman, 1400 N. Waukegan Rd., Lake Forest, Ill. 60045

Filed May 4, 1990, Ser. No. 519,290
Int. Cl.[5] A61G *7/053, 7/10*
U.S. Cl. 5—81 R **6 Claims**



1. A portable sliding transfer device comprising a seat that is adapted to support a human user for movement between one body support, such as a bed, to another body support, such as a wheelchair, said device comprising:

(a) a curved lower support plate having a substantially flat top surface, and

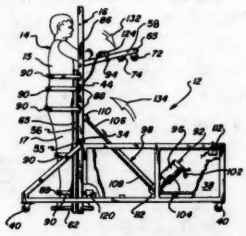
(b) an upper seat which is attached to the lower support plate such that the upper seat is slidable over the top surface of the lower support plate.

4,987,622

SELF-OPERATED STAND UP SUPPORT APPARATUS

Winfred S. Shockey, 1342 E. 19th St., Winfield, Kans. 67156

Filed May 22, 1989, Ser. No. 354,729
Int. Cl.[5] A61G *7/00*
U.S. Cl. 5—81 R **5 Claims**



1. A stand up support apparatus operable to receive and secure a person thereagainst for subsequent movement from a horizontal to a vertical position and vise versa, comprising:

(a) a main support frame assembly;

(b) a person support bed assembly including a body support assembly mounted on a support frame and pivotally connected to said main support frame assembly;

(c) said body support assembly includes a main body support connected to said support frame and an upper body support pivotally connected to said main body support and in one position having a support surface extending in the same plane as said support surface of said upper body support;

(d) said upper body support pivotal downwardly to a second position between an upper portion of said support frame at an angle of inclination relative to said main body support to form a work platform and an open area; and

(e) said upper body support includes an upper support member, hinge members to pivotally connect said upper support member to said main body support, and an anchor hinge member to secure said upper support member to said upper portion of said support frame in the same plane common to said main body support;

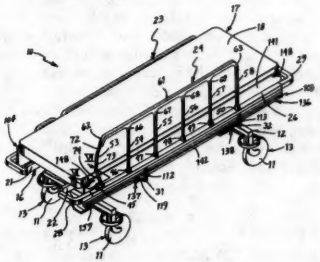
whereby the person using said stand up support apparatus can observe television and the like through said support frame.

4,987,623

HOSPITAL STRETCHER HAVING PATIENT TRANSFER DEVICE AND SIDE RAILS WITH HANDLE PORTIONS

Martin W. Stryker, Kalamazoo Township, Kalamazoo County, and Thomas W. Fennell, Portage, both of Mich., assignors to Stryker Corporation, Kalamazoo, Mich.

Filed Jan. 26, 1990, Ser. No. 470,855
Int. Cl.[5] A61G *1/02;* **A47C** *21/08*
U.S. Cl. 5—86 **29 Claims**



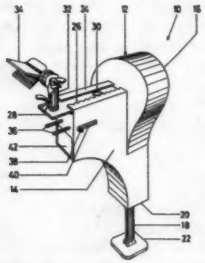
1. An apparatus comprising: a vehicle having an upwardly facing surface; a support member having thereon a support surface; and support means supporting said support member on said vehicle for movement between a retracted position in which said support member is disposed below said surface on said vehicle and an operational position in which said support member is disposed in the region of an edge portion of said surface on said vehicle and is oriented so that said support surface thereon is facing upwardly and is at approximately the same vertical level as said surface on said vehicle, said support surface including a portion which is disposed horizontally outwardly beyond said edge portion of said surface on said vehicle, wherein as said support member moves from said retracted position to said operational position said support means causes said support member to move upwardly adjacent said edge portion of said surface on said vehicle with said support member oriented so that said support surface thereon extends approximately vertically; and wherein said vehicle has a side rail spaced outwardly from said edge portion of said surface on said vehicle and movable between a lowered position in which a top of said side rail is disposed below said surface on said vehicle and a raised position in which said top of said side rail is higher than said surface on said vehicle, said upward movement of said support member with said support surface thereon approximately vertical taking place between said side rail and said edge portion of said surface on said vehicle.

4,987,624

DEVICE FOR IMPARTING MULTI-DIRECTIONAL ROCKING MOTION

David I. Nafti, c/o Schweitzer & Cornman, 230 Park Ave., New York, N.Y. 10169

Filed Mar. 2, 1988, Ser. No. 163,294
Int. Cl.[5] A47D *15/00*; B62B *9/22*
U.S. Cl. 5—109 3 Claims



1. A device for imparting multi-directional rocking motion comprising:

a housing;

a drive means supported by said housing for providing reciprocating motion to an arm extending through a wall thereof;

means for attaching said housing to a component arranged for rocking motion in relation to a surface;

said housing being attached so as to direct said arm for contact with said surface during its reciprocating motion, said rocking motion being imparted to said component in accordance with said arm direction; and

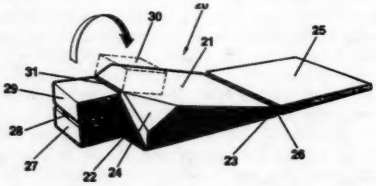
a support pad atached at the extended end of said reciprocating arm, said support pad having a friction-generating surface for ensuring good contact with said stationary surface against which it is directed.

4,987,625

ADJUSTABLE PERSONAL SUPPORT APPARATUS

Nathan E. Edelson, 526 Hickory St., Missoula, Mont. 59801

Filed Oct. 27, 1989, Ser. No. 427,347
Int. Cl.[5] A47C *20/00*
U.S. Cl. 5—431 8 Claims



1. An adjustable personal support apparatus comprising:

a substantially wedge-shaped upper-body support having a fixed protrusion at its thick end, said fixed protrusion having a base common with the base of said upper-body support, and a height less than that of thick end of said upper-body support;

said protrusion further having a width of about one-quarter to one-half of a side-to-side dimension of said thick end of said upper body support, and centered with respect thereto, and

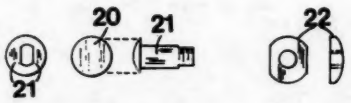
a substantially parallelepipedic head support having a length and width approximately equal to that of said fixed protrusion, and a height approximately equal to that of the difference between the height of said thick end of said upper-body support and the height of said fixed protrusion, said head support being flexibility connected along its inwardly facing top edge to the top edge of said thick end of said upper-body support at a position substantially above said protrusion, whereby said adjustable personal support apparatus may be comfortably used by persons in prone and supine positions for diverse activities.

4,987,626

LOCKING PLIERS WITH SCREWDRIVER HANDLES

Robert D. Montgomery, 1685 West 12th, Reno, Nev. 89503, and Harold L. Hull, 401 Canyon Way SP.43, Sparks, Nev. 89434

Filed Feb. 26, 1990, Ser. No. 484,817
Int. Cl.[5] B25B *7/22*
U.S. Cl. 7—127 10 Claims



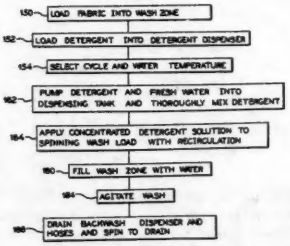
1. Locking slip-joint pliers comprising; a first and second plier member having a jaw section and a handle section, said plier members having means to be attached together to allow said jaw sections to be pivotally displaced toward and away from each other by moving said handle sections to and away from each other, said handle section of said first and said second plier member having at their distal ends a screwdriver, said plier members having a first, second, third and fourth positions, said plier members being substantially parallel to each other when said plier members are in said first and second positions, said plier member being at substantially a right angle to each other when in said third position, said plier member being substantially in a straight line with each other when in said forth position, means to lock said plier members in said third position and means to partially lock said plier members in said fourth position.

4,987,627

HIGH PERFORMANCE WASHING PROCESS FOR VERTICAL AXIS AUTOMATIC WASHER

Nihat O. Cur, St. Joseph Township, Berrien County; Jim J. Pastryk, Weesaw Township, Berrien County; Anthony H. Hardaway, Lincoln Township, Berrien County, and John W. Euler, St. Joseph, all of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jan. 5, 1990, Ser. No. 461,404
Int. Cl.[5] D06F *23/04*, *39/02*
U.S. Cl. 8—158 29 Claims



1. A method of laundering a textile wash load in a washing apparatus having a wash tub for receiving a wash liquid within which there is a rotatable wash zone including a peripheral wall, a collection zone for said wash liquid, a pump for moving said wash liquid, means for rotating said peripheral wall and

said wash load in said wash zone about a generally vertical axis, comprising the sequential steps of:

(1) introducing said textile wash load into said wash zone;

(2) rotating said wash load and said peripheral wall at a speed that is sufficient to maintain the load against the peripheral wall;

(3) introducing incremental amounts of wash liquid to said rotating wash load from a source external of said wash tub and monitoring the collection zone for the presence of wash liquid;

(4) terminating the introduction of additional amounts of wash liquid into the wash zone from said source once a sufficient amount of wash liquid has been detected in the collection zone by said monitoring;

(5) continuously passing said wash liquid from said collection zone through said rotating wash load so that the cumulative amount passed through is greater than the amount necessary to saturate the clothes load;

(6) terminating steps 2 and 5 after a first predetermined time period following the start of step 5; and

(7) rinsing said wash liquid from said wash load.

24. An apparatus for laundering a textile wash load comprising:

a wash tub for receiving a wash liquid within which there is a rotatable wash zone including a peripheral wall,

a collection zone for said wash liquid,

a pump for moving said wash liquid,

means for rotating said peripheral wall and said wash load in said wash zone about a generally vertical axis,

means for rotating said wash load and said peripheral wall at a speed that is sufficient to maintain the load against the peripheral wall;

means for introducing incremental amounts of wash liquid to said rotating wash load from a source exterior of said wash tub and monitoring the collection zone for the presence of wash liquid;

means for terminating the introduction of additional amounts of wash liquid into the wash zone from said source once a sufficient amount of wash liquid has been detected in the collection zone by said monitoring;

means for continuously passing said wash liquid from said collection zone through said spinning wash load so that the cumulative amount passed through is greater than the amount necessary to saturate the clothes load; and

means for rinsing said wash liquid from said wash load.

4,987,628

SHOE SOLE MOLDING SYSTEM

Hae Y. Kim, Busan, Rep. of Korea, assignor to Sung Bo Ind. Co., Ltd., Busan, Rep. of Korea

Filed Oct. 19, 1989, Ser. No. 424,122

Claims priority, application Rep. of Korea, Jun. 30, 1989, 9348/89

Int. Cl.[5] **A43D** *25/20*; **B29F** *1/10*

U.S. Cl. 12—17 R **2 Claims**

1. A shoe sole molding system comprising:

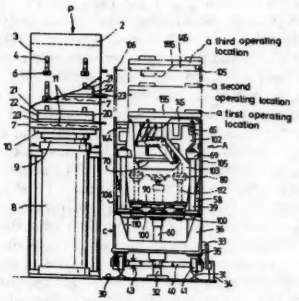
a plurality of presses (P) spaced parallel with one another and a mold control assembly (A) cooperable with said presses (P) in turn, each of said presses (P) comprising a plurality of molds (**20**) for molding shoe soles of rubber material displaced one above the other, each of which having an upper mold member (**21**), a middle mold member (**22**) and a lower mold member (**23**), said mold members (**21**), (**22**), (**23**) each having a pair of lengthwise grooves (**24**) and notches (**25**) inwardly and continuously of said grooves (**24**) at both sides thereof, said lower mold member (**23**) having an integral latch member (**26**) fixed to the front thereof, a hydraulic cylinder (**8**) and a piston (**9**) for raising or lowering said molds (**20**), said hydraulic piston (**9**) having a pressure board (**10**) fixed to the upper end thereof, a mold support plate (**7**) detachably mounted on said pressure board (**10**) and having a heating element (**11**) therein, one of said molds (**20**) being detachably mounted on said mold support plate (**7**), the others of said molds (**20**) being displaced above said one mold (**20**) one above the other,

said mold control assembly (A) comprising a body member, a carriage casing (C) for fixedly mounting said body member thereon, a rail member for rollably moving said carriage casing (C) therealong,

said rail member having a pair of rails (**31**), a fixed base for fixing said rails (**31**) thereto having a hollow boss (**32**) at the upper face thereof,

said carriage casing (C) comprising generally U-shaped wall members, a bottom plate (**35**), a cover plate (**100**) movably mounted on said carriage casing (C), and a pair of height control cylinders (**58**) having the lower end fixed to said bottom plate (**35**) and the upper end fixed to said body member, said bottom plate (**35**) comprising an anchor cylinder (**55**) and a piston having an anchor pin (**56**) fixed to the lower end thereof for keeping said mold control member in place and a pair of bigger frame control cylinders (**60**) having pistons fixed thereto at the lower ends thereof,

said body member comprising a pair of upwardly extending front and rear wall members (**105**), (**106**) fixed to said carriage casing cover plate (**100**), a bigger frame of cube shape in general nested within said front and rear wall members (**105**), (**106**), a smaller frame of cube shape in general nested within said bigger frame, a pair of toothed open casings (**144**) opened in an inward direction within said smaller frame of cube shape and having the front and



rear faces fixed to said body wall members respectively and teeth (**143**) provided along the inner upper length thereof, a lower channel member (**125**) for receiving slidably said lower mold member (**23**) fixed to the upper faces of said toothed open casings (**144**),

said bigger frame member comprising a bottom plate (**90**), a pair of upwardly extending apertured side wall members (**103**) fixed to said bottom plate (**90**) at the lower ends thereof and having channel member (**155**) pivoted thereto for receiving slidably said upper mold member (**21**) within channeled portions thereof and a plate (**63**) for joining said channel member (**145**), each of said apertured side wall members (**103**) having a link (**76**) pivoted thereto, said link (**76**) having an inwardly extending pin **76'** fixed to the lower end thereof, said bottom plate (**90**) having a plurality of non-central small holes (**92**) and said bigger frame bottom plate (**90**) having said bigger frame control cylinders (**60**) fixed thereto, said channel member (**155**) having a longitudinal through hole (**148B**),

said smaller frame member comprising a bottom plate (**80**), a pair of extending apertured side wall members (**103**) fixed to said bottom plate (**80**) at the lower ends thereof and having channel member (**145**) pivoted thereto for receiving slidably said middle mold member (**22**) within channeled portions thereof and a plate (**64**) for joining said channel member (**145**), each of said apertured side wall members (**102**) having a link (**45**) pivoted thereto, said link (**45**) having an outwardly extending pin (**45'**) fixed to the

lower end thereof, said bottom plate (80) having a plurality of non-central holes (82) in registration with said non-central holes (92) in said bigger frame, said channel member (145) having a pair of spaced through holes (148A), (148), said hole (148A) communicating with said through hole (148B), said hole (148) being placed inwardly of said hole (148A),

said body member further comprising a four-cornered frame member (70) displaced above said bottom plate (80) of said smaller frame and having a pair of downwardly extending plates (73) suspending from both leg members thereof, said suspending leg members (73) each having a lengthwise groove (74) facing in an outward direction for slidably receiving said outwardly extending link pin (76') therealong,

two pairs of cross shafts (130), (177) fixed between said front and rear wall members (105), (106), one pair (130) of said shafts being displaced above said four-cornered frame member (70) and the other pair (177) being placed above and inwardly of said shafts (130),

a first slider member displaced above said four-cornered frame member (70) and slidably moving along said shafts (130) and comprising a cross plate member (137) having a pair of holes (129) for receiving said shafts (130) and a link control cylinder (135) and a piston (136) fixed between said body front wall member (105) and the central area thereof, said cross plate member (137) having a pair of downwardly extending plates (140) suspending from both ends thereof, said suspending plates (140), each having an inner shorter groove (141) for slidably receiving said outwardly extending link pin (45') and an outer longer groove (142) for slidably receiving an inwardly extending link pin (46'), said outer longer groove (142) being displaced above and in registration with said outer grooves (74) of said four-cornered frame member (70),

a second stepped slider member (170) displaced above and inwardly of and movable together with said first slider member, said second stepped slider member (170) comprising a pair of raised planes (174) having downwardly extending apertured protrusions (174') at the front and rear edges thereof and a recessed plane (172) joining said raised planes (174) and having downwardly extending apertured protrusions (176) at the rear edge thereof and a chain bracket (173) fixed thereon, said shafts (177) for slidably mounting said second stepped slider member (170) therealong extending through said apertured protrusions (174'), said raised planes (174) each having a pinion (186) bolted thereto for engaging with the corresponding one of said teeth (143) of said toothed casings (144),

a third toothed planar slider member (180') slidably mounted on and movable together with said second stepped slider member (170), said third planar slider member (180') having a pair of toothed plates (180), a joining plate (183) joining said toothed plates (180), said toothed plates (180) each having teeth (181) along the outer edge thereof for engaging said pinions (186) adjacent thereof and a downwardly extending lengthwise channel (187) for being slidably received in said recessed plane (172) of said second slider member (170), an upwardly extending lengthwise channel (188), a fixed member (189) spaced parallel with said upwardly extending lengthwise channel (188) having a slanting surface (189') and a rotatable member of triangular shape (190) pivoted to the upper face of said toothed plates (180), said joining plate having rear and front sprockets (184) fixed to the rear and front faces thereof,

a fourth cylindrical slider member (195) slidably mounted on and movable with said third toothed planar slider member (180') and being placed between said lower channel member (125) comprising a cylindrical housing (196), a stepped-base (197) for mounting said cylindrical housing (196), a lengthwise chamber (199), a cross chamber (201) communicating with said lengthwise chamber (199), said lengthwise chamber (199) having a shaft (210) therein and a pinion (204) mounted on said shaft (210), said cross chamber (201) having a lengthwise rack (201) therein for engaging with the pinion (204) of said lengthwise chamber (199), said rack (201) having a spring (193) around one end thereof and a through shaft (205) at the other end thereof, said shaft (210) in said lengthwise chamber (199) having a locking member (211) fixed tot he outwardly extending end thereof, said locking member (211) having a pair of locking elements (213) pivoted thereto for engaging with said latch member (26) of said lower mold member (23) and pulling said mold members (21), (22), (23) out of said press (P), said stepped base (197) having a chain bracket (198) fixed to the underside thereof,

said mold control assembly further comprising a plurality of columns (39) movably mounted to said carriage bottom plate (35) at the lower ends thereof, passing through said carriage cover plate (100) and fixed to a frame member above said four-cornered frame member (70),

a pair of height control cylinders (58) fixed to the upper face of said carriage bottom plate (35) at the lower ends thereof and to the front and rear body wall members (105), (106) at the upper faces thereof,

a plurality of columns (92) fixed to the upper face of said carriage cover plate (100) at their bottom ends and to said four cornered frame member (70) movably through said registered holes (82), (92) of said bigger frame and said smaller frame,

a pair of link chains (209) each being fixed to said chain brackets (198) at both ends thereof through said sprockets (184),

a smaller frame control cylinder (85) for controlling said smaller frame fixed to the upper face of said carriage through a bottom center hold of said bigger frame (90) and a piston fixed to said bottom plate (80) of said smaller frame,

a mold-channel cooperable means (160) being nested within said channel members (145), (155) of said smaller and bigger frames for urging said channels and the corresponding one of said molds to cooperate with each other and comprising a spring (168) for urging said means to insert into said notches (25) of said mold members, and

a pair of brackets (151) each being fixed to both sides of said lower channel (125) and having a longer pin (153) and a shorter pin (152), said longer pin (153) being able to control said mold-channel cooperable means (160) by being inserted into said through hole (148B) through said hold (148A) and said shorter pin (152) for controlling said mold-channel cooperable means (160) by being inserted in said through hole (148).

4,987,629

DECK FOR WIDE-SPAN BRIDGE

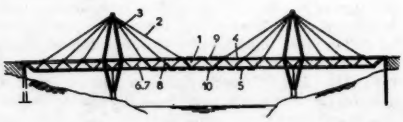
Jean M. Muller, 13 Rue Victor Hugo, 92150 Suresnes, France

Filed Mar. 21, 1989, Ser. No. 326,786

Claims priority, application France, Mar. 25, 1988, 88 03957

Int. Cl.[5] E01D *11/00*

U.S. Cl. 14—6 **10 Claims**



1. A bridge consisting of a deck and means for supporting this deck, the deck comprising:

an upper frame forming a traveling surface;

a lower frame forming a traveling surface, narrower than the upper frame;

prestressed connecting girders, known as "diagonal members", slanting both relative to the vertical and relative to

the length of the bridge and joining the edges of the upper and lower frames;

auxiliary connecting girders, also prestressed, situated in vertical planes passing through the edges of the lower frame,

wherein at least one prestressing cable of a diagonal girder is anchored to the edge of the upper frame, and passes transversely through the lower frame and then through the diagonal girder which is symmetrical therewith relative to the longitudinal vertical plane of symmetry of the bridge, and is anchored onto the opposite edge of the upper frame.

4,987,630

DESTATICIZING AND CLEANING APPARATUS

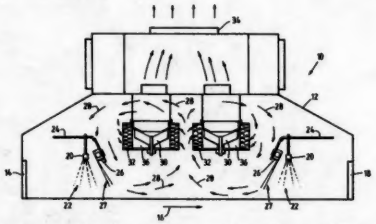
Phillip G. Allen, Merseyside, and Gordon J. Rigby, Nr. Wigan, both of England, assignors to Delco Electronics Overseas Corporation, Detroit, Mich.

Filed Jan. 11, 1990, Ser. No. 463,688

Claims priority, application United Kingdom, Jan. 17, 1989, 8900951.8

Int. Cl.[5] A47L *5/38*

U.S. Cl. 15—1.51 **8 Claims**



1. Apparatus for destaticizing and cleaning partially assembled items being transported on a continuously movable line, the apparatus comprising a housing which substantially surrounds the continuously movable line, the housing having an entrance and an exit for the continuously movable line; static reduction means which provides a static reduction zone positioned within the housing through which the continuously movable line passes; air input means which provides air input into the housing, air circulation within the housing, and an air curtain through which the continuously movable line passes; and air exhaust means which exhausts air from within the housing; the volumetric input of air provided by the air input means being substantially equal to the volumetric output of air exhausted by the air exhaust means such that substantially no movement of air occurs at the entrance to and exit from the housing.

4,987,631

CLEANING ATTACHMENT

Wallace C. S. Eaglesham, Rockhampton, Australia, assignor to Daxrose Pty. Ltd., Queensland, Australia

Filed Jul. 5, 1989, Ser. No. 375,891

Int. Cl.[5] B60S *3/04;* **A46B** *11/02;* **A47L** *11/38*

U.S. Cl. 15—21.1 **10 Claims**

1. A cleaning attachment to fit a forklift truck for cleaning substantially vertical surfaces, said attachment comprising a mounting frame adapted for connection with the hydraulic hoist of said forklift for vertical movement, a support frame, an elongate scrubbing element mounted with the support frame, said two frames being interconnected by spaced apart substantially parallel arms pivotally mounted with the support frame and mounting frame respectively to allow reciprocating movement of the support frame and scrubbing element toward and away from the surface to be cleaned, whereby the scrubbing element can be traversed over the surface to be cleaned by vertical movement of the hoist and horizontal movement of the forklift.

4,987,632

WIPING ARTICLE

Gavin B. Rowe; Andrew N. Smith, and Alan Wooten, all of Northants, England, assignors to Lever Brothers Company, New York, N.Y.

Filed May 6, 1985, Ser. No. 731,203

Claims priority, application United Kingdom, May 11, 1984, 8412047; May 11, 1984, 8412044

Int. Cl.[5] A47L *13/17;* **A47K** *7/03;* **C11D** *17/04*

U.S. Cl. 15—104.93 **14 Claims**

1. A substantially dry-to-the-touch wiping article which is suitable for use in cleaning soiled surfaces in the presence of water, the article comprising an absorbent substrate, having a water-absorption capacity of at least 1 g/g, in the form of a sheet impregnated with detergent active compound, the surface of the absorbent substrate having applied thereon a moisture barrier to cover from 10% to 95% of the total area of each side of the sheet in such a manner that the moisture barrier on one side coincides with the moisture barrier on the opposite side, so as to form a sandwich enclosing from 10% to 95% of the area of the absorbent substrate impregnated with detergent active compound, said moisture barrier and said detergent active compound being in separate layers, and wherein the absorbent substrate comprises a first portion impregnated with said detergent active compound and a second portion substantially free from detergent active compound, the first portion defining a plurality of areas of the absorbent substrate which are separated from each other by the second portion.

4,987,633

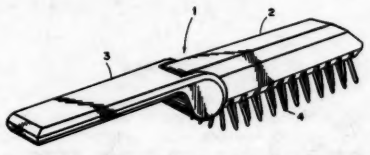
BRISTLE HAIR BRUSH RETRACTABLE BY COLLAPSING HANDLE

William R. Heneveld, 9946 Elmada, Dallas, Tex. 75220

Filed Oct. 23, 1989, Ser. No. 425,337

Int. Cl.[5] A46B *9/10*

U.S. Cl. 15—185 **29 Claims**



1. A brush having retractable bristles, said brush including an elongated housing having a first wall with a plurality of openings located across said first wall through which the bristles extend from said first wall when in extended operable position and are retracted when in stored position;

bristle support means interior of said housing;

a handle associated with said housing and adapted to be grasped for supporting the brush during the brushing operation;

said handle being pivotally mounted on said housing;

interconnected means interconnecting said handle with said bristle support means for actuating said bristle support means when the handle is pivoted to cause said bristles to be extended through said openings and from said wall when said handle is pivoted to an extended position from said housing, in which extended position the handle serves the function of a support handle for the brush;

said interconnection means being provided to move the bristle support means in the housing in a direction both away from or toward said wall and in a direction longitudinally of said elongated housing in addition to directions

away and toward said wall, said movement of said bristle support means in the direction longitudinally of said housing being simultaneous with the movement away from or toward said wall whereby the combined movements toward or away from said wall is inclined to the longitudinal axes of said housing;

said handle being pivotable to a folded position over said wall and said openings in which folded position said bristle support means is actuated by said handle and interconnection means to cause said bristles to be retracted into said housing;

said handle being configured to provide a cover for covering all of the said openings.

4,987,634

IMPLEMENT FOR CLEANING OR TREATING SURFACES OR FOR APPLYING MEDIA TO SURFACES

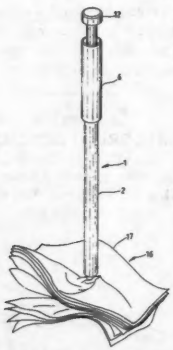
Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 204,734

Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719904

Int. Cl.[5] A47L *13/16*

U.S. Cl. 15—209 R **10 Claims**



1. An implement for cleaning or treating surfaces or for applying media to surfaces with a holder and a deformable disposable working part interchangeably gripped by said holder, the latter comprising a sleeve and a sliding part guided thereon, a handle on an end of said sliding part projecting over the sleeve, and grippers for gripping the working part arranged at the other end of the sliding part, said grippers being displaceable in a first direction from an unobstructed, open position projecting over the sleeve into a use position for fixing the working part and by means of said handle said grippers can be moved via said sliding part in a second, opposite direction for releasing the working part, wherein the grippers and sleeve are constructed in such a way that the grippers grip the working part solely by mounting thereon and by pressing by means of said sleeve and are displaceable into the use position by deformation thereof in the held area, wherein said sleeve is in the form of a tube which is widened at its upper end to form a gripping tube, said handle being formed as a cap engaging over the gripping tube and which on engaging on the gripping tube determines the spread open position of the grippers, and wherein means are provided for axially adjusting the position of the handle relative to the sliding part for setting the maximum opening width of the grippers in said unobstructed, open position.

4,987,635

CAN TROWEL

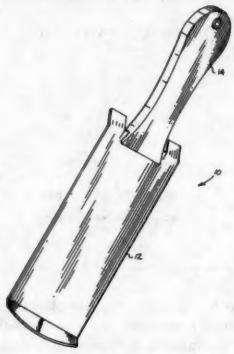
Bobby D. Young, R.D. #1, Box 299-B, Shelocta, Pa. 15774

Filed Feb. 2, 1987, Ser. No. 9,491

Int. Cl.[5] A47L *25/00*; B01F *13/00*

U.S. Cl. 15—236.01 **1 Claim**

1. A new and improved trowel for removing material from a material holding container comprising a blade means including a substantially planar central portion formed with a forward and rearward edge and a first and second surface; a forward curvilinear portion integrally formed to said forward edge of said central portion and extending at an acute angle relative to said first surface including a substantially planar body portion and a continuous curvilinear free edge portion, and a handle means secured centrally to said rearward edge extending longitudinally of said central portion, and a plurality of planar edge portions integrally secured to said second edge on either side of said handle means and extending at an acute angle relative to said second surface of said central portion



enabling access to material within said container utilizing said continuous curvilinear free edge portion and said plurality of planar edge portions.

4,987,636

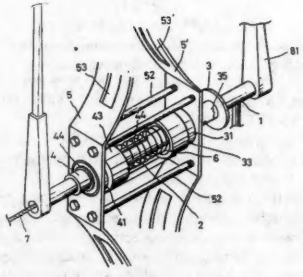
SYNCHRONOUS VEHICLE WINDSHIELD WIPE AND DEFOGGER WIPER MECHANISM

Shiao Jenn-Chyou, No. 11, Alley 23, Lane 101, Sec. 4, Hsin Hai Rd., Taipei, Taiwan

Filed Aug. 24, 1989, Ser. No. 399,894

Int. Cl.[5] B60S *1/30*

U.S. Cl. 15—250.28 **2 Claims**



1. A synchronous vehicle windshield wiper and defogger wiper mechanism, comprising:

two spaced frame members (5,5') adapted for fixed mounting on a vehicle body;

bearings (31,41) carried by said frame members to define a rotational axis;

a hollow oscillatable windshield wiper shaft (1) located on said rotational axis beyond the space circumscribed by said frame members, said shaft having internal spline grooves therein;

a defogger wiper support sleeve (4) extending through one one of said bearings in axially spaced relation to said windshield wiper shaft;

an axially elongated drive member (2) for said defogger wiper support sleeve, said drive member extending through the other bearing and having continuous telescopic connections with the sleeve and windshield wiper shaft; said drive member having a splined section (21) in continuous driven connection with said spline grooves, and a cylindrical section (22) slidably and rotatably extending within the sleeve;

clutch means between said drive member and said sleeve, whereby axial slidable motion of the drive member in the direction of the sleeve enables the drive member to transmit a rotary oscillatory force from the shaft to the sleeve;

said clutch means comprising an axially extending strip (24) projecting radially outwardly from said cylindrical section of the drive member, and a recess formed in said sleeve;

said recess comprising an axially extending slot section (47) that has a circumferential width dimension that is substantially the same as the width of said strip (24), said recess further comprising a mouth section that has a circumferential width dimension greater than the circumferential oscillation stroke of said strip, said recess further comprising a convergent guidance section (46) between the mouth section and slot section for guiding said strip into the slot section when said drive member is moved axially in the direction of the sleeve;

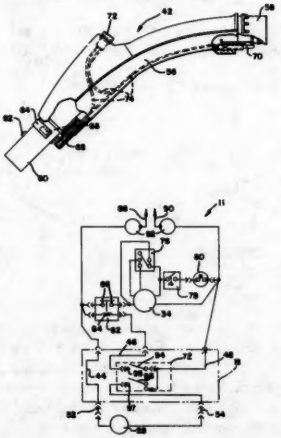
said sleeve and drive member being oriented so that said strip is at all times within the recess.

4,987,637

CANISTER VACUUM CLEANER AND METHOD OF MANUFACTURE

Linda A. Zummer, St. Joseph; Donald E. Janke, Benton Township, Berrien County, both of Mich., and James R. Giordano, Danville, Ky., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 20, 1986, Ser. No. 920,959
Int. Cl.[5] A47L *5/12, 9/28*
U.S. Cl. 15—328 **6 Claims**



1. A method of manufacturing a canister vacuum cleaner comprising the steps of

forming a floor cleaning unit having a rotatable brush and a brush motor for rotating said brush,

forming a canister having a suction motor for providing suction,

providing means for pneumatically interconnecting said canister and said floor cleaning unit to provide said suction at said floor cleaning unit, said pneumatically interconnecting means comprising a wand and a wand handle and hose assembly, said wand handle and hose assembly comprising a wand handle and a flexible hose, said wand being adapted physically to engage said floor cleaning unit, said flexible hose being adapted physically to engage said canister, said wand handle being adapted physically to engage both said wand and said flexible hose,

disposing a three-position electrical control switch on said wand handle, said control switch in a first position being adapted to enable the deenergization of both said brush motor and said suction motor and in a second position being adapted to enable the energization of said suction motor and the deenergization of said brush motor and in a third position being adapted to enable the energization of both said brush motor and said suction motor, and

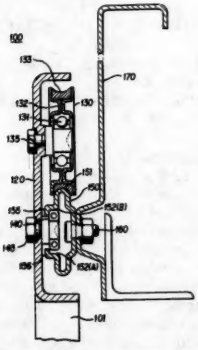
configuring the electrical control circuit for said canister vacuum cleaner to enable the desired operation of said canister vacuum cleaner under the control of said three-position electrical control switch and to enable said wand handle and hose assembly including said three-position control switch to be used in a second canister vacuum cleaner in place of a second wand handle and hose assembly that forms a component part of said second vacuum cleaner, said second canister vacuum cleaner further including a second floor cleaning unit having a second rotatable brush and a second brush motor for rotating said brush and a second canister having a second suction motor for providing suction, said second wand handle and hose assembly including a second wand handle and a second flexible hose and a two-position electrical control switch disposed on said second wand handle, said two-position control switch in a first position being adapted to enable the deenergization of both said second brush motor and said second suction motor and in a second position being adapted to enable the energization of both said second brush motor and said second suction motor.

4,987,638

SLIDING DOOR ASSEMBLY

Nickolas Ribaudo, 3970 N.W. 27th Ter., Boca Raton, Fla. 33434

Filed May 5, 1988, Ser. No. 190,481
Int. Cl.[5] E05D *15/00*
U.S. Cl. 16—89 **13 Claims**



1. A sliding door assembly comprising a door hanger, an upthrust roller rotatably mounted on said door hanger, and a track for a sliding door assembly, said track comprising means

adapted to receive a supporting member, an exterior, upper portion adapted to provide a rolling surface for a sheave, and an interior, lower portion spaced from said exterior, upper portion adapted to provide a rolling surface for an upthrust roller so that in the event of the failure of the sheave, the upthrust roller can move into contact with the interior, lower portion of the track, thereby allowing the door to continue operating;

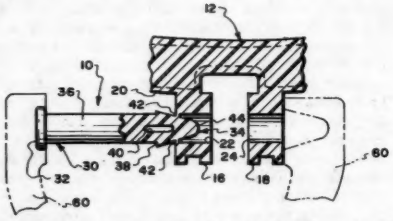
wherein said track has a symmetrical, reversible configuration and further comprises a bottom portion positioned opposite from said exterior, upper portion; said bottom portion being rotatable about a horizontal axis such that said bottom portion of said track becomes said exterior, upper portion which provides said rolling surface for said sheave, while said exterior, upper portion become said bottom portion; and said track also being able to serve as a left-hand track and a right-hand track.

4,987,639

FRANGIBLE FASTENING CONSTRUCTION FOR HANDLES AND METHOD OF FASTENING

David E. Baiuley, Anaheim, and Josef E. Bingisser, Santa Ana, both of Calif., assignors to Ropak Corporation, Fullerton, Calif.

Filed Jan. 5, 1989, Ser. No. 293,888
Int. Cl.[5] B65D *25/28*
U.S. Cl. 16—126 **12 Claims**



1. A fastening construction for securing items together, comprising:

a fastening pin, having a body with a nose at one end;

means for receiving said pin; and

frangible means supporting said pin axially aligned with and close to said receiving means;

wherein said frangible means is a flashing formed in molding said pin and said receiving means, and said frangible means is easily broken upon driving said pin further into said receiving means, and further wherein said means for receiving is a lug of a handle or lid, having an aperture formed therein.

4,987,640

SUPER-THIN HINGE WITH RESILIENTLY BIASED CATCH

Tsong-Chi Lin, Kaohsiung Hsien, Taiwan, assignor to Hu Lin Industrial Co., Ltd., Taiwan

Filed Mar. 2, 1989, Ser. No. 318,020
Int. Cl.[5] E05D *11/10*
U.S. Cl. 16—327 **2 Claims**

1. A thin hinge comprising:

a metal bowl having (a) a base, (b) an upstanding side extending from said base and having an opened portion bounded by terminal ends of said upstanding side, and (c) two pairs of discrete upstanding retaining walls extending from said base, said retaining walls of each said pair being parallel to one another so as to form a retaining opening therebetween, said retaining openings extending parallel to one another along said base toward said opened portion such that each said retaining opening has a closed end closed by said upstanding side and an opened end at said opened portion of said upstanding side;

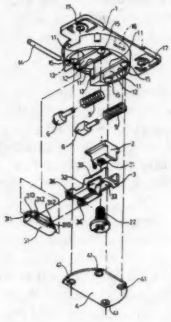
a respective sliding block located in each respective said retaining opening;

a respective spring located in each respective said retaining opening between a respective said sliding block and a respective said closed end for urging said respective sliding block toward a respective said opened end;

a shaft having a pin hole therethrough;

a pin mounted in said opened portion of said upstanding side by said terminal ends of said upstanding side, said pin being received in said pin hole of said shaft for mounting said shaft for pivoting movement in said opened portion and such that said sliding blocks are urged directly against said shaft in a direction perpendicular to said pin;

a hinge arm including one end having two spaced flanges with an aperture therein;



a mounting means for mounting said one end of said hinge arm to said shaft for pivoting movement therewith, said mounting neans including recesses in said shaft in which respective said spaced flanges are received such that said pin also passes through said apertures in said flanges; and

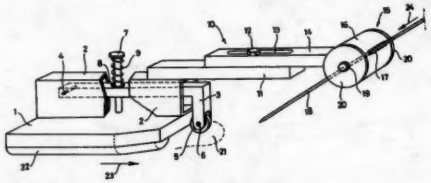
a cover plate which is attached to said upstanding side to enclose side sliding blocks and said springs in said retaining openings.

4,987,641

DEVICE FOR STICKING SLAUGHTER ANIMALS

Harry Logtenberg, Bilthoven, and Henk Jansen, Zeist, both of Netherlands, assignors to Nederlandse Organisatie voor toegepastnatuurwetenschappelijk Onderzoek TNO, Netherlands

Filed May 17, 1990, Ser. No. 525,494
Claims priority, application Netherlands, May 19, 1989, 8901268
Int. Cl.[5] A22B *5/04*
U.S. Cl. 452—65 **7 Claims**



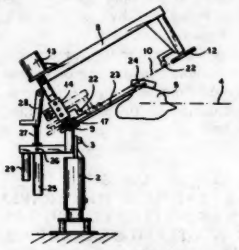
1. A device for severing the carotid artery of a slaughtered animal, in particular a pig, with a pointed object or a knife, comprising: a support movable along the breast side of the slaughtered animal, a knife guide carried by said movable support, a knife means displaceable in said knife guide, and a scanning element carried by said movable support for detecting a part of the body which is in a known spatial relationship with the place where the carotid artery must be severed.

4,987,642

SYSTEM FOR CUTTING MEAT FROM BONE

Daniel Villemin, Chennevieres S/Marne; Janusz Plusa, Champigny sur Marne; Daniel Guilband, Saint Fulgent; Jean Leclere, Creteil, and Paul Romand, Valence, all of France, assignors to Etablissements Arrive S.A., Saint Fulgent and Union Financiere Pour le Developpement de L'Economie* Cerealiere Unigrains, Seine, both of, France

Filed Jan. 12, 1990, Ser. No. 464,512
Claims priority, application France, Jan. 13, 1989, 89 00571
Int. Cl.[5] A22C *21/00*
U.S. Cl. 452—136 12 Claims



1. An apparatus for separating a soft material such as meat from a hard material such as bone, the apparatus comprising:

a generally stationary support;

means for holding an object comprised of the hard and soft materials stationarily adjacent the support with an interface between the hard and soft material extending to a cutting plane;

a chassis pivotal on the support about a chassis axis transverse to the plane;

an outer pulley pivotal on the chassis remote from the support and generally tangent to the plane;

a carriage displaceable on the support transversely of the plane;

an inner pulley pivotal on the carriage close to the support a chain spanning said outer and inner pulleys for engaging and cutting said meat; and spaced along the plane from the outer pulley; and

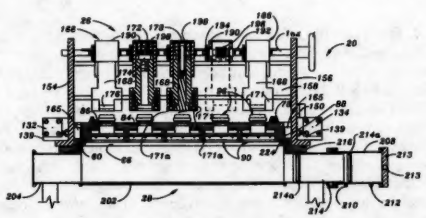
drive means connected to one of the pulleys for rotating same and advancing the chain.

4,987,643

SLIDE PLATE PATTY FORMING APPARATUS

Richard G. Powers, Overland Park, Kans.; Eugene J. London, Allentown, Pa.; Lewis F. Alley, Kansas City, Mo.; James E. Anderson, Prairie Villiage, and Joseph S. Zeets, Olathe, both of Kans., assignors to Marlen Research Corporation, Overland Park, Kans.

Filed Aug. 10, 1989, Ser. No. 392,075
Int. Cl.[5] A22C *7/00*
U.S. Cl. 425—139 18 Claims



1. Patty forming apparatus comprising:

a patty forming plate assembly including structure defining a patty forming cavity, and a slidable piston presenting a patty material-engaging face formed of porous material and movable within said cavity between a retracted position allowing flow of patty forming material into said cavity for forming of a patty therein, and an extended discharge position for discharge of the formed patty;

means supporting said plate assembly for reciprocating, translational, fore and aft shifting movement thereof between a material-receiving position and a patty-discharging position;

means operably coupled with said plate assembly for delivery of patty forming material to the assembly when the assembly is in the material-receiving position thereof, in order to fill said cavity and form said patty therein;

means for shifting said piston to the discharge position thereof when said assembly is in said patty-discharging position; and

means for forcibly separating said patty from said piston face when the piston is in said patty-discharging position thereof,

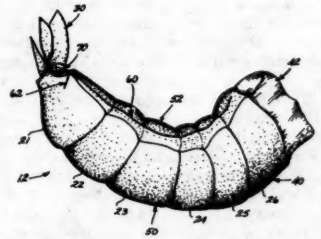
said patty-separating means including means for applying a burst of pressurized fluid through said piston face to separate said patty therefrom.

4,987,644

SHELL CUTTING METHOD FOR PROCESSING SHRIMP

Ronald J. Marion, Issaquah, Wash., assignor to Fletcher Seafoods, Ltd., Seattle, Wash.

Filed Apr. 10, 1990, Ser. No. 507,712
Int. Cl.[5] A22C *25/00*
U.S. Cl. 452—2 5 Claims



1. A process for preparing shrimp, each shrimp having a head, a body having dorsal and ventral sides and a shell enclosing the body, the body having a plurality of interconnected segments including a first segment to which a tail is attached, a last segment closest to the head, and a second to last segment adjacent to the last segment, the process comprising:

creating a ventral cut in the shell along the ventral side, the ventral cut extending from the first segment at least through the second to last segment; and

creating a tail cut in the side of the first segment, the tail cut extending from adjacent the tail and making an acute angle with the ventral cut.

4,987,645

AUTOMATIC PIECING OF OVERLAPPED LEADING AND TRAILING ENDS OF SLIVERS IN A TEXTILE MACHINE

Yoshio Kawasaki, Shimada; Yoshiaki Kishita; Tatsutake Horibe, both of Horibe; Masakatsu Fujii, Ogaki, and Keiji Onoue, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Aichi, Japan

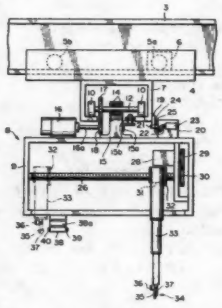
Filed Sep. 18, 1990, Ser. No. 408,732
Claims priority, application Japan, Sep. 21, 1988, 63-237145
Int. Cl.[5] D01G *23/00;* D01H *15/00;* B65H *54/22*
U.S. Cl. 19—25 2 Claims

1. A method of automatically positioning a trailing end of a first sliver in an exhaustion can and a leading end of a second

sliver in a reserve can, in such a manner that said ends overlap each other, in an operative zone of a piecing unit by means of a sliver gripper movable apart from and close to the sliver piecing unit and grips the sliver therein and releases the same therefrom, wherein the method comprises the steps of:

displacing the sliver gripper close to the operative zone of the sliver piecing unit while holding a first sliver by the sliver gripper so that the first sliver is introduced into the operative zone of the sliver piecing unit;

fixedly holding the first sliver in the operative zone; displacing the gripper apart from the sliver piecing unit while holding the first sliver in the operative zone, so that the first sliver is severed at the operative zone to form a trailing end of the first sliver;



again displacing the sliver gripper close to the operative zone of the sliver piecing unit while holding a second sliver by the sliver gripper, so that the second sliver overlaps the trailing end of the first sliver held in the operative zone;

fixedly holding the overlapped portion of slivers in the operative zone; and

again displacing the gripper apart from the sliver piecing unit while holding the second sliver in the operative zone, so that the second sliver is severed at the operative zone to form a leading end of the second sliver;

whereby the trailing and leading ends of slivers to be pieced together are positioned in the operative zone of the sliver piecing unit in an overlapping manner for the preparation of the piecing operation of the sliver piecing unit.

4,987,646

METHOD AND APPARATUS FOR OPERATING A FIBER TUFT FEEDER

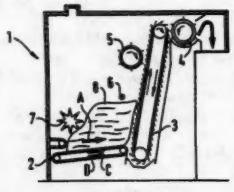
Ferdinand Leifeld, Kempen, and Josef Temburg, Jüchen, both, Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchen-Gladbach, Fed. Rep. of Germany

Filed Feb. 20, 1990, Ser. No. 481,594

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1989, 3905138; Oct. 12, 1989, 3934040

Int. Cl.[5] D01G *9/16*

U.S. Cl. 19—97.5 **11 Claims**



1. A fiber feeder apparatus comprising:

(a) an endless supply conveyor belt having a conveying surface for supporting a fiber pile;

(b) an endless spiked lattice arranged at one end of the supply conveyor belt and extending at an upward inclination therefrom; said spiked lattice having spikes arranged to penetrate into the fiber pile;

(c) first drive means connected to said spiked lattice for driving the spiked lattice in a conveying direction oriented upwardly from the supply conveyor belt for effecting removal of fibers from the fiber pile by the spikes and entrainment of the fibers by the spiked lattice upwardly from the fiber pile;

(d) a second drive means connected to said supply conveyor belt for driving said supply conveyor belt such that the fiber pile is being fed by the conveying surface into contact with said spikes; and

(e) control means connected to said second drive means for effecting a nonuniform driving of said supply conveyor belt; said control means comprising a time control device;

(f) device and means for reversing direction of said supply convey or belt.

4,987,647

SECURING A FLAT HEAD TO A TRAVELLING FLAT CHAIN BAR USING COUPLING PIN AND CIRCLIP MEANS IN A TEXTILE CARDING MACHINE

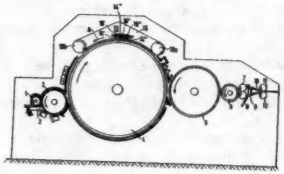
Walter von Gehlen, Mönchengladbach, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany

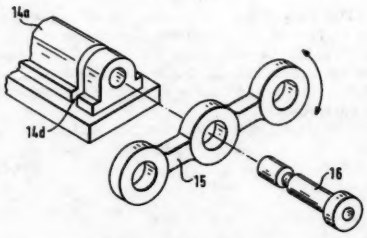
Filed Apr. 28, 1989, Ser. No. 344,978

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814412

Int. Cl.[5] D01G *15/02, 15/08, 15/24*

U.S. Cl. 19—111 **3 Claims**





1. In a travelling flat bar having a head, a bore hole in the head, said bore hole having an axis, a coupling element received in the bore hole and being arranged for attaching the flat bar to a flat-moving chain and securing means for readily releasably retaining said coupling element in said bore hole; the improvement wherein said coupling element comprises a coupling pin including a pin shank having a threadless surface and being provided with a recess; said pin being axially slidably introducible into and withdrawable from said bore hole; said head having a slot oriented transversely to the bore hole axis and communicating with said bore hole; said securing means being a circlip insertable in said head through said slot; in a locking position said circlip projecting into said recess in the

shank and into said slot in the head for preventing said pin from being withdrawn from said bore hole.

4,987,648

COMBING MACHINE WITH WORKSTATIONS HAVING A MONITORING UNIT AT EACH WORKSTATION

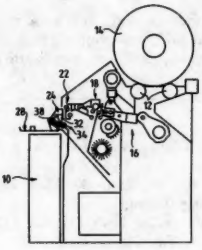
Heinz Clement, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

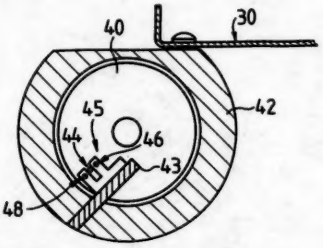
Filed Apr. 19, 1989, Ser. No. 340,238

Claims priority, application Switzerland, Apr. 19, 1988, 01432/88

Int. Cl.[5] D01G *19/10, 19/24*

U.S. Cl. 19—115 R **20 Claims**





1. A combing machine comprising

a plurality of workstations, each said workstation having means for combining a combed web into a sliver in a working position of said means, said means being movable from said working position in response to at least one of a thickened portion and a thinned portion of a combed web passing therethrough; and

a plurality of monitoring units, each said monitoring unit being disposed at a respective means for combining said web, said monitoring unit being disposed for monitoring movement of said means from said working position.

4,987,649

METHOD OF AUTOMATIC CONVEYANCE OF TEXTILE MATERIAL IN RECIPIENTS

Urs Meyer, Hohfurriste. 1, CH-8172 Niederglatt ZH, Switzerland, and Niklaus Gartenmann, Breitestr. 90, CH-8400 Winterthur, Switzerland

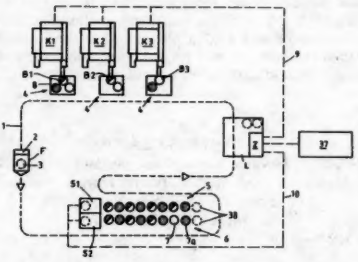
Filed Nov. 22, 1989, Ser. No. 440,910

Claims priority, application Switzerland, Nov. 28, 1988, 4410/88

Int. Cl.[5] D01H *9/18*

U.S. Cl. 19—159 A **23 Claims**

1. A method of conveying textile material in recipients (7, 8) from a machine delivering textile material to a machine receiving textile material by means of a self-propelled conveying carriage (F) whose movements are contolled by a central control unit (Z) connected to the textile material delivering machines (K1–K3) and to the textile material receiving machines (S1, S2), characterised in that the carriage (F) is controlled for the return of recipients (7) from the textile material receiving machine (S1, S2) to the textile material delivering machine (K1–K3) by the central control unit (Z) on the basis of control signals delivered thereto, and a checking station (L) is



provided on the path of the carriage (F) from the textile material receiving machine (S1, S2) to the textile material delivering machine (K1–K3) to monitor the content and/or condition of the or each recipient (58) on the carriage (F) and is connected to the control unit (Z).

4,987,650

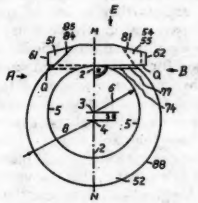
RADIALLY FLEXIBLE SNAP RING

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 915,297, Oct. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 580,581, Feb. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 235,307, Feb. 17, 1981, abandoned. This application Oct. 6, 1988, Ser. No. 261,016

Int. Cl.[5] B65D *63/00;* **F16B** *21/18*

U.S. Cl. 24—16 R **20 Claims**



1. A ring having an imaginary medial plane with

a medial axis therein normal to and through said medial plane, wherein an inner face is formed with a first radius around said medial axis to border an inner space in said ring,

wherein one end of said ring forms an inner finger and the other end of said ring forms at least two outer fingers while a slot is provided between said outer fingers, said inner finger is extended through said slot with the bottom of said slot close to said inner finger and substantially parallel to the bottom of said inner finger,

wherein said fingers extend at least slightly beyond the outer face of said ring to form ends on said fingers and to permit the use of a tool on said ends to press said ends towards each other, whereby said inner face of said ring widens at least slightly in radial direction and said ring compresses automatically under own force of spring-action to its original size of its inner face, when said ends of said fingers are not pressed towards each other;

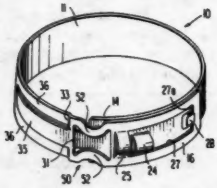
wherein a second axis imagined through said medial plane is distanced from said medial axis to constitute an eccentric

axis, while the outer face of said ring is partially formed by a second radius around said second axis; whereby the radial thickness of said ring reduces proportionate with the peripheral distances from its biggest, its medial portion "H", wherein said fingers are provided on their roots where they extend from said rings with radially relative to said outer face of said ring outwardly inclined necks while said fingers extend from said roots to said ends of said fingers in a direction which is substantially normal to the direction of said medial plane, and, wherein the biggest radial thickness of said ring exceeds one fourth of of the length of said first radius of said inner face.

4,987,651
EARLESS CLAMP

Hans Oetiker, Horgen, Switzerland, assignor to Hans Oetiker AG Maschinen- und Apparatefabrik, Horgen, Switzerland

Filed Sep. 20, 1989, Ser. No. 409,798
Int. Cl.[5] B65D *63/02*
U.S. Cl. 24—20 R **28 Claims**



1. A clamp structure, especially a clamp structure of the earless type which comprises clamping band means having end portions adapted to overlap when the clamp structure is installed to provide an inner and an outer clamping band portion, mechanical connecting means operable to mechanically interconnect the inner and outer clamping band portions, force-engaging surface means in the inner and outer clamping band portions to enable the application of an external tightening force when installing the clamp structure on an object to be fastened thereby, and further means in the clamping band means itself to impart elastic stretchability to the clamping band means in its longitudinal direction so as to enable automatic compensation for changes in temperature and/or pressure by elastic changes in the length of the clamping band means, the further means including non-rectilinear lateral clamping band portions on both sides of the central longitudinal plane of the clamping band means which extend on a respective side of the central longitudinal plane of the clamping band means in such a manner that, as viewed in a direction transverse to the longitudinal direction, the lateral band portions extend in mutually opposite directions relative to the central longitudinal plane.

4,987,652
SPRING CLAMP

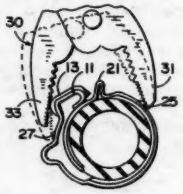
George E. Spaulding, 3277 Lake Dr., S.E., Grand Rapids, Mich. 49506

Filed Feb. 9, 1990, Ser. No. 477,557
Int. Cl.[5] B65D *63/02*
U.S. Cl. 24—20 R **1 Claim**

1. A spring clamp comprising:

an elongated substantially rectangular piece of metal having a latch hook at one end and a projecting latch near the opposite end such that when formed into a substantially circular configuration said latch hook can grip and contain said projecting latch to hold said clamp in position about an object to be clamped; and

a plurality of spaced projecting tool gripping surfaces on said rectangular piece of metal to enable said spring clamp to be opened and closed by a conventional pliers, one of said spaced projecting tool gripping surfaces is positioned on the end of said latch hook, a second one of said plurality of gripping faces is positioned adjacent the back of said latch hook and a third one of said plurality of gripping faces is positioned near said projecting latch, said tool

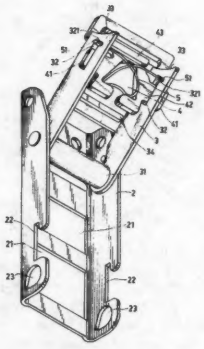


gripping surface on said latch hook is oriented in a first direction and said tool gripping face adjacent said latch hook is oriented in a direction opposite to said first direction.

4,987,653
BAND RETAINING UNIT HAVING A MULTI-LOCK EFFECT

Shu-Huang Lin, No. 99, Lane 50, Hsin Ping Road, Taiping Hsiang, Taichung, Taiwan

Filed Apr. 20, 1990, Ser. No. 512,177
Int. Cl.[5] A44B *21/00*
U.S. Cl. 24—68 CD **1 Claim**



1. A band retaining unit including a female retaining body, a male retaining body connected pivotally to said female retaining body, a gripping element and a spring element, each of said male retaining body and said female retaining body being generally U-shaped and having a free end, a base wall and two parallel side walls; said male retaining body being capable of being rotated to engage said free end of said male retaining body within said free end of said female retaining body so as to clamp tightly a first end portion of a retaining band between said male retaining body and said female retaining body; the other end portion of said retaining band being adapted to be fastened to a first article, said retaining band being tautened at a portion thereof between said band retaining unit and said first article; said female retaining body being adapted to be mounted securely on a second article and including two gripping notches formed in said side walls of said female retaining body, and two aligned rope holes formed through said side walls of said female retaining body; said male retaining body including two slide slots formed through said side walls of said male retaining body in alignment with said retaining notches of said female retaining body, two depressions formed in said side walls of said male retaining body in alignment with said rope holes of said female retaining body, so that a rope can be passed

through said rope holes of said female retaining body and into said depressions of said male retaining body in order to confine said male retaining body between said rope and said female retaining body, and a gripping element having two engagement arms disposed respectively and slidably within said slide slots; said spring element being disposed between said side walls of said male retaining body so as to push said engagement arms of said gripping element into said gripping notches of said female retaining body, thereby ensuring engagement of said free end of said male retaining body within said free end of said female retaining body; characterized in that said gripping element includes a projection extending therefrom which is positioned so as to be obstructed by said rope from moving in said band retaining unit, and said spring element has a portion which is positioned between said engagement arms of said gripping element, so as to prevent separation of said engagement arms of said gripping element from said slide slots of said male retaining body.

4,987,654

DUAL-RELEASE FASTENER FOR STRAP ENDS

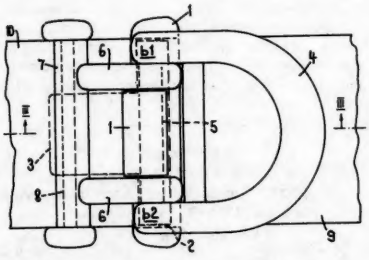
André Mejias, Vevey, Switzerland, assignor to Premiere de Tabbah SA, Fribourg, Switzerland

Filed Oct. 20, 1988, Ser. No. 260,394

Claims priority, application European Pat. Off., Nov. 12, 1987, 87810653.3

Int. Cl.[5] A44B *1/04*

U.S. Cl. 24—170 9 Claims



1. A dual-release fastener for connecting first and second ends of a strap, comprising:

a first element defining a passage through which said first strap end is slidably received;

a first lever cooperating with said first element to releasably retain said first strap end in a fixed position relative thereto;

a second element pivotally connected to said first element and attached to said second strap end, said second element being coupled to said first lever for releasing the same upon pivoting of said second element with respect to said first element; and

a second lever rigidly connected to said second element to permit selective rotation of said second element relatively to said first element, said first and second levers being disposed on opposite sides of said first strap end, thereby permitting release of said first strap end from either of said opposite sides; wherein said first element comprises:

a U-shaped lower portion having two arms which form an open end;

a first spindle connecting said arms across said open end to define said passage through which said first strap end is slidably received; and

a hook-shaped upper portion to which said second element is pivotally connected.

4,987,655

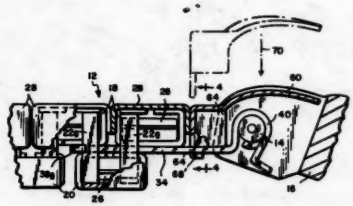
END CONNECTOR FOR EXPANSIBLE WATCH BAND

Stephen F. Bert, North Scituate, R.I., assignor to Textron, Inc., Providence, R.I.

Filed May 4, 1990, Ser. No. 518,791

Int. Cl.[5] A44C *5/18*

U.S. Cl. 24—265 WS 10 Claims



1. For use in combination with an elongated longitudinally expansible watch band of the type having a row of top links overlying a row of bottom links, each bottom link being connected to two adjacent top links by first and second pairs of generally U-shaped staples, said pairs of staples being separated from each other by a space measured in the direction of the band width and being arranged respectively along opposite sides of the band, said staples having legs protruding into the links connected thereby, with springs housed in the links and acting on said legs to yieldably contract the band longitudinally, a connector for connecting the band to a spring bar or the like carried on a watch case, said connector comprising:

a generally planar base member having inner and outer ends with first and second side edges extending therebetween, said inner end being configured and dimensioned for insertion into an end of the band between the rows of top and bottom links with said first and second side edges being respectively located laterally inwardly of the first and second pairs of staples at the said end of the band, and with an exposed section of said base member including said outer end protruding beyond the end most top link at the said end of the band; first engagement means at the outer end of said base member for coupling said base member to said spring bar;

first and second ears respectively protruding laterally from said first and second side edges at the inner end of said base member, said first and second ears being respectively located in the direction of the band length at interlocked positions inwardly of the innermost staples of the first and second pairs of staples at the end of said band, the width of said base member measured at said ears being greater than said space; and

a cover member interposed between the end most top link at the said end of the band and the watch case at a location overlying the exposed section of said base member and the spring bar coupled thereto, said cover member including second engagement means for securing said cover member to said base member.

4,987,656

PLAQUE HOLDING CLIP

Seiichi Sato, Kanagawa, Japan, assignor to Kato Hatsujo Kaisha, Ltd., Yokohama, Japan

Filed Jan. 8, 1990, Ser. No. 462,391

Claims priority, application Japan, Sep. 25, 1989, 1-248622

Int. Cl.[5] F16B *19/00*

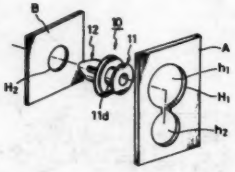
U.S. Cl. 24—297 2 Claims

1. A plaque holding clip, comprising:

a head for clamping and holding a plaque,

a trunk for introducing the clip into a fitting bore of a panel to anchor it therein, said trunk comprising a pair of elastic legs extending upward from its lower tip portion and symmetrically arranged relative to the axis of the head with a pair of spaces provided therebetween, each of said

elastic legs having an outer periphery rounded semi-circularly coaxially with the head and being convergently connected to the lower end of said trunk to form a pointed tip on the trunk for ease of introducing the clip into a



fitting bore, said outer periphery of said pair of elastic legs being tapered and so formed that they are subjected to the force evenly applied thereto by the peripheral wall of the fitting bore when said clip is introduced therein.

4,987,657

AIRTIGHT, WATERTIGHT MECHANICAL SEAM FOR JOINING PANELS OF INDUSTRIAL STRENGTH FABRICS

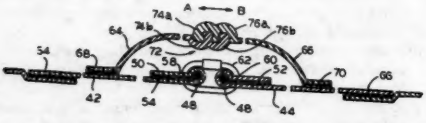
Jack Moreland, Dolton, Ill., assignor to MPC Containment Systems, Ltd., Chicago, Ill.

Continuation of Ser. No. 523,657, Aug. 15, 1983. This application Jul. 16, 1986, Ser. No. 886,917

The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.

Int. Cl.[5] A44B *1/04*

U.S. Cl. 24—389 **17 Claims**



1. An airtight, watertight mechanical seam for forming an industrial fabric membrane by joining two panels of synthetic rubber reinforced by fiber to cover large areas of the earth and to prevent moisture, chemicals, or pollutants from leaking through the membrane and seam, said mechanical seam comprising:

a. cable means which is in tension when a longitudinal force is applied thereto, said cable means being attached to and running along at least one edge of each of said two panels of fabric;

b. a plurality of connector means for interconnecting the cable means of two adjoining panels at a plurality of points which are distributed at substantially uniform positions along the length thereof for mechanically joining said cable means of said two panels;

c. panel flaps attached and sealed to said fabric near and running along at least one edge of each of said two panels of fabric, said flaps being attached and continuously sealed to said fabric at a longitudinal position located between said cable means and an expanse of said panel, whereby said cable is between said edge and said panel flaps; and

d. slide closure means for joining and continuously sealing together said panel flaps across a joint formed by said cable means and said connector means thereby giving said two panels a single airtight, watertight surface.

4,987,658

SLIDE FASTENER

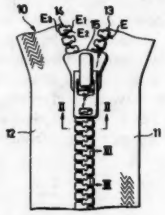
Yoshiyuki Horita, Toyama, Japan, assignor to Yoshida Kogyo, K.K., Tokyo, Japan

Filed Feb. 16, 1990, Ser. No. 480,917

Claims priority, application Japan, Feb. 20, 1989, 1-39770

Int. Cl.[5] A44B *19/02*

U.S. Cl. 24—403 **2 Claims**



1. A slide fastener comprising a pair of stringer tapes, rows of discrete coupling elements secured respectively to longitudinal inner edges and of said stringer tapes and a slider reciprocably movable along said rows of coupling elements, each of said coupling elements having at one end a bulged coupling head portion, a barrel portion and a heel portion, and a decorative coat deposited over an upper surface of said coupling element and extending at least partially into a vertical rear end region of said heel portion, beyond a corner region into a vertical front end region of said coupling head portion, beyond a corner region into a vertical rear end region of said heel portion, and further partially into opposite vertical side regions of said coupling element, wherein said decorative coat is derived from a composite heat transfer film comprising a cover layer, a releasing layer, a protective layer, a depositing metal layer, and a heat sensitive adhesive layer superimposed one on another in this order.

4,987,659

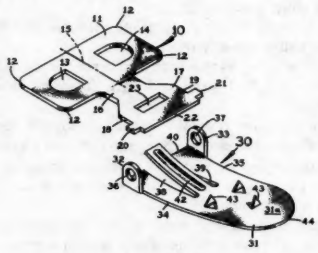
SPRING CLIP

Stanley Grandis, 1595 Lands End Rd., Manalapan, Fla. 33462

Filed Apr. 19, 1990, Ser. No. 511,041

Int. Cl.[5] A44B *21/00*

U.S. Cl. 24—499 **6 Claims**



1. A spring clip for a clip-on article comprising:

a substantially flat first clip member having

openings for receiving a fastener to attach said first clip member to the clip-on article,

and laterally outwardly projecting tabs on opposite side edges near one end of said first clip member;

and a second clip member having

a base with opposite major faces,

pointed prongs projecting from one of said major faces for biting engagement with an article on which said clip-on article is to be mounted,

apertured ears projecting from said one major face and pivotally receiving said tabs on said first clip member for pivotal adjustment of said second clip member between (1) a closed position in which said base of the second clip member extends close and generally parallel to said first clip member and said prongs extend toward said first clip member and (2) an open position in which said base of the second clip member extends at a substantial angle away from said first clip member,

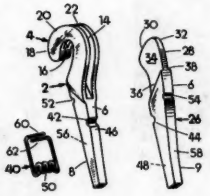
and a leaf spring arm joined at one end to said base and extending therefrom between said ears and bearing resilently against said first clip member to maintain said apertured ears of said second clip member pivotally receiving said tabs of the first clip member.

4,987,660

HOOK-TYPE CLOTHESPIN

Esteban N. Sagucio, 98-626 Moanalua Loop (Apt. #210), Aiea, Hi. 96701

Filed Oct. 16, 1989, Ser. No. 422,244
Int. Cl.[5] A44B *13/02*
U.S. Cl. 24—567 **1 Claim**



1. A clothespin attachable onto a clothesline at a level lower than the level of said clothesline, comprising:

(a) a first clamping member in which the top and includes a hook defining generally circular inner and outer edges which are communicated by a closed-ended thru-slot, said closed end portion corresponding to the first jaw thereof;

(b) a second clamping member in which the upper portion includes a reduced thickness to be received within said thru-slot and increased width towards a biased end to limit the extent to which the second clamping member extends into the said thru-slot corresponding to the second jaw thereof;

(a) an elastic means dispensed and adapted to urge said first jaw and said second jaw to normally closed position, said means including a metal spring; and

(d) said upper end of sa'd second clamping member is mounted to freely reciprocate within said closed-ended thru-slot when said clothespin is manipulated to grip clothing inserted between said jaws.

4,987,661

SNAP BUCKLE

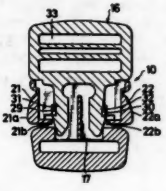
Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed May 10, 1990, Ser. No. 521,422
Claims priority, application Japan, May 13, 1989, 1-54696[U]
Int. Cl.[5] A44B *11/25*
U.S. Cl. 24—625 **3 Claims**

1. A buckle comprising a male member having a pair of resilient legs and a female member having a pair of sub-chambers for receiving said resilient legs respectively, said female member including:

(a) a casing formed by an upper plate and a lower plate disposed in spaced parallel relationship and defining therebetween said sub-chambers, said upper and lower plates respectively having inwardly directed flanges, and

(b) a pair of resilient arms respectively having inwardly directed neck portions movable between said flanges, and a stop finger normally spaced apart from but engageable



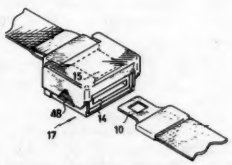
with one of said flanges when lateral stresses are exerted upon said resilient arms.

4,987,662

SEAT BELT RELEASE GUARD

David J. Haffey, 10 Carrothers Court, Saskatoon, Saskatchewan, Canada S7L 6T3; Susan C. Haffey, and Orville Olm, both of Saskatoon, Canada, assignors to David J. Haffey, Saskatoon, Canada

Filed Oct. 27, 1989, Ser. No. 428,182
Int. Cl.[5] A44B *11/26*
U.S. Cl. 24—633 **18 Claims**



1. A seat belt release guard for use with a seat belt assembly in which said seat belt assembly includes two belt sections with respective free ends a latch plate on one free end and a latch plate receiving buckle assembly on the other free end, said latch plate receiving buckle assembly including an anchor end secured to the respective belt section, and an opposite latch plate receiving free end latch means for engaging and retaining the latch plate and a latch release member thereon, said release guard comprising in combination a buckle assembly receiving component having a belt end and an opposite latch plate receiving end, and a cover component having a belt end, an opposite latch plate receiving end, and a pair of opposite side walls extending between the belt and latch plate receiving ends, the cover component being hingedly secured to said receiving component adjacent one end thereof and moveable in an arc extending in an end to end direction of said receiving component, from an open, unguarded buckle release position to a closed, guarded position covering the associated latch release member against access and preventing actuation of the latch release member, means to detachably latch said cover component to said receiving component when in the closed position, means responsive to pressure on the opposite side walls of the cover component to release said cover component from said receiving component, allowing said cover component to move to the open unguarded position and means to secure said receiving component to the associated buckle assembly.

4,987,663

APPARATUS FOR STRAIGHTENING WEFT YARNS IN FABRICS

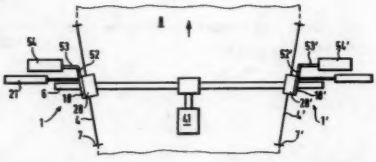
Helmut Epple, Saal/Donau, Fed. Rep. of Germany, assignor to Mahlo GmbH & Co. KG, Fed. Rep. of Germany

Division of Ser. No. 108,020, Oct. 13, 1987, Pat. No. 4,899,425. This application Nov. 8, 1989, Ser. No. 433,556

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1986, 3638909; May 6, 1987, 3715086

Int. Cl.[5] D06H *3/12, 3/10;* D06C *3/00*

U.S. Cl. 26—51.3 18 Claims



1. An apparatus for straightening weft yarns in a continuous fabric web being transported in a transporting direction, comprising:

two tensioning means, situated at margins of said fabric web for retaining respective selvages of said fabric web over a predetermined length thereof and for stretching said fabric web essentially in the weft direction with a force increasing in the transporting direction;

driving means for driving said two tensioning means, said driving means comprising two separately controllable drives, each drive being coupled to one of said two tensioning means;

sensor means for sensing longitudinal forces in said transporting direction acting on said tensioning means; and

controller means for controlling said driving means such that said longitudinal forces acting on both said tensioning means are made equal.

4,987,664

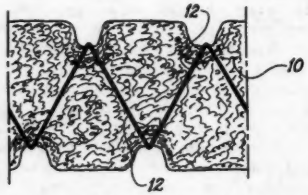
PROCESS FOR FORMING AN INTERLOCKED BATTING OF CARBONACEOUS FIBERS

Francis P. McCullough, Jr., Lake Jackson; R. Vernon Snelgrove, Damon, both of Tex., and Bhuvenesh C. Goswami, Clemson, S.C., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 344,327, Apr. 27, 1989. This application Oct. 18, 1989, Ser. No. 423,792

Int. Cl.[5] D04H *1/46, 1/54*

U.S. Cl. 28—103 18 Claims



1. A process for forming an interlocked fibrous structure comprising at least one batting of non-flammable carbonaceous first polymeric fibers by the steps comprising implanting said batting of carbonaceous fibers with at least one non-carbonaceous second polymeric fiber and then heat treating the fibrous structure in an inert atmosphere to substantially permanently set said second polymeric fiber and form said second polymeric fiber into a non-flammable carbonaceous fiber.

4,987,665

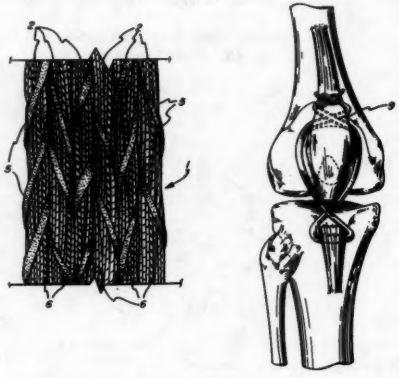
PROSTHETIC TUBULAR ARTICLE

Barry L. Dumican, Newtown, and Barbara Andrews, Bethel, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 146,510, Jan. 21, 1988, which is a continuation of Ser. No. 835,493, Mar. 3, 1986, Pat. No. 4,792,336. This application Mar. 22, 1988, Ser. No. 171,607

Int. Cl.[5] D02G *1/02*

U.S. Cl. 28—218 12 Claims



1. A method of texturizing a plurality of fibers or yarns comprising:

(1) deforming the plurality of fibers or yarns by twisting in one direction;

(2) setting the deformation of said plurality of fibers or yarns from step (1) by twisting in the opposite direction without removing the deformation;

(a) heating them to their glass transition temperature under a vacuum of up to about 5 torr; and

(b) cooling the fibers or yarns to ambient temperature; and

(3) mechanically removing the twist inserted in the fibers or yarns from step (1).

4,987,666

METHOD OF MAKING COVERS FOR FOAM BODIES USING A SEAM STABILIZER

Sandra L. Smith, Pontiac, Mich., assignor to Hoover Universal, Inc., Plymouth, Mich.

Filed Feb. 15, 1990, Ser. No. 480,314

Int. Cl.[5] B68G *7/00*

U.S. Cl. 29—91.1 8 Claims

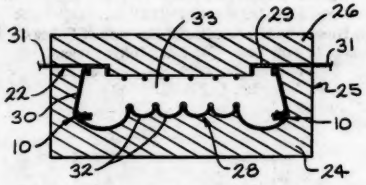
1. The method of manufacturing a composite component of a seat assembly consisting of a foam body having a predetermined shape and a cover member for said body having welts secured therein, said welts having a tear away body portion connected to a tab portion, said method comprising the steps of:

(a) shaping said cover member with said welts secured therein to said predetermined shape of said foam body;

(b) providing a mold member corresponding to said predetermined shape;

(c) molding said foam body in place upon said cover member

by pouring in place an expandable liquid foaming material within said mold member in such a manner that said foam body is bonded to said cover member and conforms in shape to said predetermined shape; and



(d) removing said body portions of said welts to form said seat component.

4,987,667

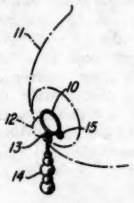
METHOD OF DECORATIVE A HUMAN BREAST

Hans Zwart, 214 Northview Rd., Dayton, Ohio 45419

Continuation of Ser. No. 321,696, Mar. 10, 1989, abandoned. This application Apr. 3, 1990, Ser. No. 503,728

Int. Cl.[5] B21F *43/00*

U.S. Cl. 29—160.6 9 Claims



1. A method of decorating a human breast having a projecting nipple, comprising the steps of forming an annular element of spring-like material and including a ring portion having a diameter substantially the same size as the nipple and relatively movable opposite end portions, positioning the end portions to project outwardly from the ring portion, moving the end portions to enlarge the diameter of the ring portion, mounting the enlarged ring portion on the nipple, and releasing the end portions causing the ring portion to grip the nipple around the periphery of the nipple.

4,987,668

MACHINE-TOOL

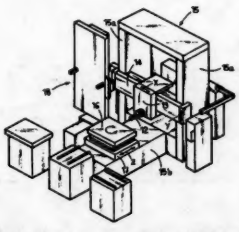
Edouard Roesch, La Chaux-de-fonds, Switzerland, assignor to Dixi S.A., Switzerland

Filed Jan. 16, 1990, Ser. No. 465,920

Claims priority, application Switzerland, Jan. 25, 1989, 218/89

Int. Cl.[5] B23Q *3/157*; B23C *1/027, 1/14*

U.S. Cl. 29—568 3 Claims



1. A machine-tool having a rotatable horizontal spindle and comprising a frame, said frame including a closed porch with two vertical columns, a horizontal transverse member mounted on and in front of a front surface of said columns, said transverse member being movable vertically along said front surface of said columns, a carriage movable transversely with respect to said spindle and along said transverse member, aid spindle being carried by said carriage, a table situated in front of said columns and mounted in such manner as to be movable longitudinally, that is parallel to the axis of said spindle, and means for rotatably mounting a workpiece to a top surface of said table.

4,987,669

METHOD OF TIGHTENING SCREW

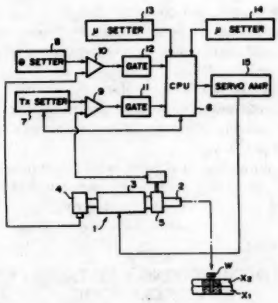
Tatsumi Makimae, and Tsutomu Yamada, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshiama, Japan

Filed Feb. 9, 1990, Ser. No. 477,527

Claims priority, application Japan, Feb. 10, 1989, 1-32027

Int. Cl.[5] B23Q *17/00*

U.S. Cl. 29—407 2 Claims



1. A method of tightening a screw member comprising the steps of

determining the difference between a tightening axial force which is produced at a limit of elasticity when the friction coefficient between a screw member and a member into which the screw member is to be threaded is at a maximum and that when the friction coefficient between the screw member and the member into which the screw member is to be threaded is at a minimum,

determining a seating torque on the basis of the difference between the tightening axial forces, and

tightening the screw member by a predetermined angle after a tightening torque reaches the seating torque.

4,987,670

METHOD OF ASSEMBLING AN OVERRUNNING ROLLER CLUTCH WITH IMPROVED SPRING RETENTION

James R. Papania, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 373,134, Jun. 29, 1989, abandoned. This application Mar. 19, 1990, Ser. No. 494,336

Int. Cl.[5] F16D *15/00*

U.S. Cl. 29—451 1 Claim

1. A method for installing an accordion type energizing spring into a roller clutch of the type having a cage with a plurality of journal blocks, each of which has a flat end face, said roller clutch also having an equal plurality of roller control cars, each of which has a flat end face opposed to a respective journal block end face and circumferentially spaced therefrom by a predetermined distance, comprising the steps of,

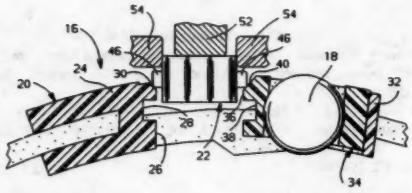
providing each journal block and respective control car end

face with a retention groove and a lead in chamfer sloping radially inwardly to said retention groove,

providing said energizing spring with a pair of flat end leaves that are spaced apart by a free state length greater than said predetermined distance,

providing said energizing spring end leaves each with a flexible retention tab bent out of the plan e of said end leaf and sized so as to fit into a respective retention groove,

compressing said spring end leaves between a pair of guides so as to move said retention tabs back into the planes of



said end leaves and so as to compress said spring to a length substantially equal to said predetermined distance,

centering said compressed spring between a respective pair of opposed end faces,

pressing said spring with a relatively movable plunger inwardly until said compressed tabs slide off of said guides and flex out into contact with said respective end face lead in chamfers, and,

pressing said spring farther in with said plunger until said tabs slide over said lead in chamfers and flex out into said retention grooves to retain said spring.

4,987,671

PROCESS FOR MOUNTING A TILTABLE COVER ON A VEHICLE ROOF

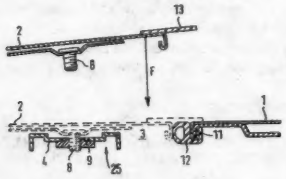
Andreas Clausen-Schaumann, Bernried, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke AG, Fed. Rep. of Germany

Filed Oct. 11, 1989, Ser. No. 420,819

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835122

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—434 **6 Claims**



1. A process for mounting a tiltable cover as a vehicle roof, comprising the steps of:

fastening a front cover end of the cover to supporting body of a tilt-out device to permit swivelling movement of the cover about a transverse axis into and away from a roof opening in the vehicle roof;

removably mounting a member with a stop portion at the rear of the roof opening to limit the swivelling movement of the cover as the cover is moved to a closed position and fix the cover at a desired height;

connecting the cover at the desired height with a cross-strut of the tilt-out device; and

swivelling the cover sufficiently away from the roof opening and removing the member with a stop portion to permit vertically precise and rapid mounting of the cover.

4,987,672

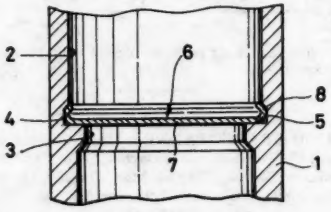
METHOD OF PARTITIONING THE INTERNAL SPACE OF A HOLLOW CYLINDRICAL MEMBER

Shuniti Honda, and Toshimitsu Shida, both of Fujisawa, Japan, assignors to Fuji Valve Co., Ltd., Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,273

Int. Cl.[5] B21D *39/00*

U.S. Cl. 29—509 **1 Claim**



1. A method of partitioning the internal space of a hollow cylindrical member, which comprises the steps of:

inserting a single circular partition member into the hollow cylindrical member, the partition member having a circular plate portion and a rim portion integrally formed with the circular plate portion so as to define a unitary partition member and axially extending from one side of the periphery of the circular plate portion, the hollow cylindrical member being formed therein with a space portion of larger diameter and a space portion of smaller diameter, the portion of larger diameter being formed at its end adjacent to the portion of smaller diameter with an annular groove;

placing the partition member on a shoulder face formed between the two space portions so that the circular plate portion comes in contact with the shoulder face; and

applying an axial force to an end face of the rim portion of the partition member thereby causing the rim portion to deform so that a portion of the rim portion penetrates into the annular groove, the partition member being thereby tightly secured to the annular groove and consequently to the hollow cylindrical member.

4,987,673

APPARATUS FOR PACKAGING SEMICONDUCTOR DEVICES

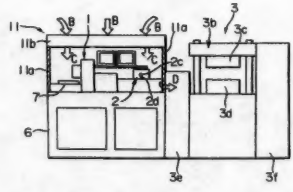
Masahisa Kogura; Haruo Yoshida, and Minoru Tanaka, all of Fukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 16, 1988, Ser. No. 207,623

Claims priority, application Japan, Jun. 18, 1987, 62-151723; Jun. 18, 1987, 62-151724; Jun. 18, 1987, 62-171725

Int. Cl.[5] B23P *23/00;* **F24F** *7/00;* **H05K** *13/00;* **H01L** *21/58*

U.S. Cl. 29—564 **7 Claims**



1. An apparatus for attaching leads to and encapsulating semiconductor dies comprising:

a supporting bench;

a die bonder for positioning and bonding semiconductor dies to respective predetermined locations on a respective one of a plurality of lead frames, each lead frame having a pattern of leads formed therein, said die bonder being disposed on and supported by said supporting bench;

a wire bonder for connecting electrodes of a semiconductor die to said leads of the pattern of the respective lead frame with metallic wires, said wire bonder being disposed directly subsequent and adjacent to said die bonder and disposed on and supported by said supporting bench;

molding means for molding and sealing each of said semiconductor dies with a predetermined portion of the respective lead frame into a resinous package, said molding means being disposed directly subsequent and adjacent to said wire bonder for performance of die bonding, wire bonding, and molding in an uninterrupted continuous sequence; and

an air cleaner separating said die bonder and wire bonder from said molding means and supplying clean air to said die bonder and wire bonder but not to said molding means.

4,987,674

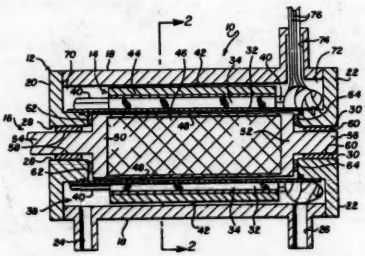
METHOD OF MAKING A DYNAMOELECTRIC MACHINE WITH SUPERCONDUCTING MAGNET ROTOR

Joseph Denk, Manhattan Beach, Calif., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 217,729, Jul. 7, 1988, Pat. No. 4,908,347. This application Sep. 1, 1989, Ser. No. 402,008

Int. Cl.[5] H02K *15/12*

U.S. Cl. 29—596 **10 Claims**



1. A method of magnetizing a superconducting rotor for a dynamoelectric machine comprising the steps of:

providing a rotor assembly having a superconductor contained within a non-magnetic, high strength retaining sleeve;

installing said rotor assembly within said stator assembly whereby said stator winding is disposed about said rotor assembly;

securing said rotor assembly with respect to said stator assembly in a fixed angular position;

energizing one of said stator windings with a direct current to produce a magnetic field permeating said rotor assembly;

cooling said rotor assembly including said superconductor to a temperature below the critical temperature of said superconductor simultaneously with said energizing step to freeze said magnetic field therein;

de-energizing said stator winding; and

releasing the angular position of said rotor assembly with respect to said rotor assembly.

4,987,675

METHOD OF MANUFACTURING COILED HEATING ELEMENT

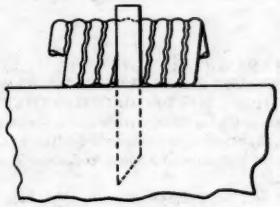
James D. J. Jackson, Kidderminster, and Derek E. Morgan, Malvern, both of United Kingdom, assignors to Micropore International Limited, Worcestershire, United Kingdom

Filed Jul. 25, 1988, Ser. No. 224,005

Claims priority, application United Kingdom, Jul. 25, 1987, 8717668

Int. Cl.[5] H01C *1/03*

U.S. Cl. 29—615 **15 Claims**



1. A method of manufacturing a coiled heating element, which method comprises the steps of:

providing an unsheathed coiled element of bare resistance wire, the wire having a cross-sectional dimension and a surface, and the coiled element having a coil pitch not greater than twice the cross-sectional dimension of the wire;

stretching the element by an amount permitting recovery to its original configuration;

applying to the element an electrically insulating particulate material;

allowing the stretched element to return towards its original configuration thereby trapping particulate material between adjacent coils of the element; and

heating the element so as to oxidize the surface of the wire.

4,987,676

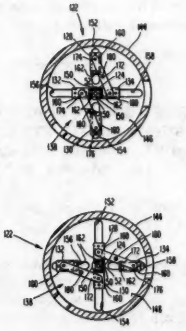
END EFFECTOR FOR A ROBOTIC SYSTEM

Vincent G. Amorosi, Warminster, Pa., assignor to Quad Systems Corporation, Horsham, Pa.

Filed Aug. 23, 1989, Ser. No. 397,403

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—740 **20 Claims**



1. A centering chuck for centering work on pick-up means of an assembly apparatus which comprises:

(a) a housing having an opening therethrough defining a bore having a longitudinal axis;

(b) first and second pairs of opposed centering fingers supported by said housing, each pair of fingers of said first

and second pairs of opposed centering fingers being supported on said housing for reciprocal movement toward and away from each other and the axis of said bore along a plane perpendicular to the axis of said bore;

(c) linkage means coupled to each pair of fingers of said first and second pairs of opposed centering fingers for effecting reciprocal movement of each pair of fingers of said first and second pairs of opposed centering fingers toward and away from each other and the axis of said bore; and

(d) driving means mounted on said housing and coupled to said linkage means for effecting movement of said linkage means thereby reciprocating each pair of fingers of said first and second pairs of opposed centering fingers.

4,987,677

BONDED CERAMIC METAL COMPOSITE SUBSTRATE, CIRCUIT BOARD CONSTRUCTED THEREWITH AND METHODS FOR PRODUCTION THEREOF

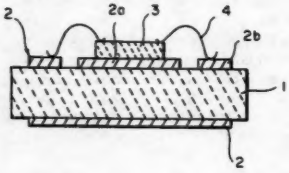
Tadashi Tanaka, Chiba; Kazuo Matsumura, Kanagawa; Hiroshi Komorita, Kanagawa, and Nobuyuki Mizunoya, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 342,843, Apr. 25, 1989. This application Feb. 26, 1990, Ser. No. 484,875

Claims priority, application Japan, Apr. 25, 1988, 63-101681

Int. Cl.[5] H05K *3/02, 3/10*

U.S. Cl. 29—846 **12 Claims**



1. A method of producing a bonded ceramic metal composite substrate comprising the steps of applying a copper member to a desired position on a surface of a ceramic substrate and heating the resulting assembly to a temperature below the melting point of copper but above the eutectic temperature of copper and oxygen to directly bond the copper membe to the substrate, wherein said copper member is selected to have an initial surface roughness such that the median surface roughness (R_a) of said copper member after said heating step is not greater than 3 μm, and the maximum surface roughness (R_{max}) of said copper member after said heating step is not greater than 18 μm.

4,987,678

APPARATUS FOR INSTALLING WIRE IN GRID SUPPORT STRUCTURE

Nathaniel J. Satterfield, Anderson, S.C., and James D. Struttmann, Indialantic, Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Mar. 21, 1989, Ser. No. 326,745

Int. Cl.[5] H01R *43/04;* **B23P** *23/00*

U.S. Cl. 29—868 **44 Claims**

1. A system for installing a segment of strand material in a support structure therefor, said support structure including a strand-receiving trough having side walls and a bottom floor recessed beneath a top surface of said support structure, comprising in combination:

first means for controllably supplying strand material to said trough of said support structure;

second means, positioned at a first location of said trough, for controllably inserting and retaining a first portion of said strand material into a first, strand receiving region of said trough such that said first portion of said strand material is urged into said trough adjacent to the bottom floor thereof;

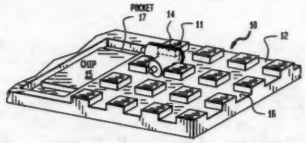
third means for causing further strand material to be drawn from said first means and installed along said bottom floor of said trough;

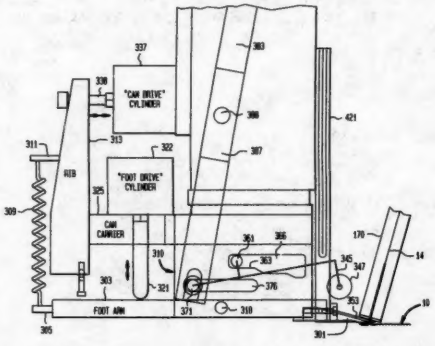
fourth means for severing, at a second location of said trough, strand material being supplied by said first means from said further strand material installed by said third means, so that a segment of strand material is installed between said first and second locations of said trough.

27. A method of installing a segment of insulation-clad wire in a wire-supporting grid structure having a two-dimensional array of wire-receiving regions comprising the steps of:

(a) mounting said wire-supporting grid structure on an X-Y table for for two-dimensional translation thereby;

(b) arranging a first, wire-feed, insulation-stripping and wire-severing mechanism adjacent to said X-Y table so as to be displaceable toward and away from a wire-supporting grid structure mounted on said X-Y table, said first mechanism including an insulation-stripping and wire-cutting device positionable adjacent to said wire-supporting grid structure;





(c) positioning a second, wire-installing mechanism adjacent to said X-Y table, so that a wire-supporting grid structure mounted on said X-Y table may be two-dimensionally displaced relative to said second mechanism, said second mechanism including a foot element through which a first-portion of a wire may be urged into a wire-receiving region of said wire-supporting grid structure and a wheel through which a second portion of wire drawn from said first mechanism may be urged into a second wire-receiving region of said grid structure as said X-Y table is translated;

(d) displacing said first mechanism toward said wire-supporting grid structure so that said insulation-stripping and wire-cutting device is positioned adjacent to a first wire-receiving region of said wire-supporting grid structure;

(e) feeding insulation-clad wire to said insulation-stripping and wire-cutting device and thereby directing wire into said first wire-receiving region of said wire-supporting grid structure;

(f) bringing said foot element into engagement with a first portion of said wire, so as to urge said first portion of said

wire into said first wire-receiving region of said wire-supporting grid structure; and

(g) bringing said wheel into engagement with a second portion of said wire and translating said X-Y table so a to cause rotation of said wheel over said second portion of said wire, drawing wire from said first mechanism and urging the drawn wire into said second wire-receiving region of said grid structure as said X-Y table is translated.

4,987,679

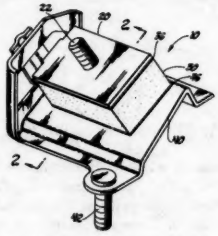
VEHICULAR POWERTRAIN MOUNT ASSEMBLY

Thomas E. Rau, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 197,948, May 24, 1988, abandoned, which is a continuation-in-part of Ser. No. 42,105, Apr. 10, 1987, abandoned. This application Jul. 31, 1989, Ser. No. 387,413

Int. Cl.[5] B23P *25/00*

U.S. Cl. 29—897.2 **3 Claims**



1. A method of making a vehicular mount assembly to resiliently support a powertrain member on a frame member in a motor vehicle comprising the steps of:

providing a volume of a vulcanized elastomeric material having a first and a second bondable surface,

providing a first and a second bracket member each having a bondable surface,

applying a thermoset adhesive selected from the group consisting of epoxy and polyurethane to at least one of said first bondable surface on said volume of elastomeric material and said bondable surface on said first bracket member,

applying a thermoset adhesive selected from the group consisting of epoxy and polyurethane to at least one of said second bondable surface on said volume of elastomeric material and said bondable surface on said second bracket member,

clamping said volume of elastomeric material and said first and second bracket members together with said elastomeric material and said adhesive sandwiched in between,

curing said adhesive.

4,987,680

HYDRAULIC LOPPING SHEAR/POLE PRUNER

Gordon W. Garrett, 1540 Hoffman Ave., Monterey, Calif. 93940

Filed Apr. 17, 1989, Ser. No. 339,260

Int. Cl.[5] B23P *19/04*

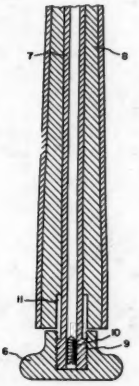
U.S. Cl. 30—228 **8 Claims**

1. A hydraulic lopping shear/pole pruner for use either within the operator's normal reach or at a distance, comprising:

(a) a lopping shear comprising:

a hook structure having a fixed shearing edge cooperating with a blade slidably mounted in said hook structure, a hydraulic cylinder fixed to said hook structure, a reciprocating power piston within said cylinder detachably connected to said blade, a coaxial handle coextensive with said cylinder, a bore through the longitudinal axis of said handle opening at one end into said cylinder, an elongated piston of lesser diameter than said power piston sliding in said bore and said cylinder, fluid means within said cylinder and said bore by which operational force applied to said elongated piston is multiplied and used to produce force and motion in said power piston and said attached blade, said elongated piston and said handle being only long enough to produce the desired amount of travel and force in said power piston and said blade, a knob detachably mounted at one end of said elongated piston by which said elongated piston can be grasped and moved within said bore, bias means within said cylinder to extend said power piston until said attached blade slides over said shearing edge while retracting and retaining said elongated piston into said handle to its maximum extent;

(b) elongated extension means to which said lopping shear can be attached and operated at some distance or height from the operator, comprising:



two tubes of any desired length wherein one tube fits within the end of the other, annular bushings fitted at each end of the outer tube whereby the inner tube is supported concentrically and slidably within said outer tube, a handle coextensive with one end of said inner tube, attachment means at the other end of said inner tube whereby said elongated piston of said lopping shear can be detachably connected, a sleeve fitted concentrically over the end of said outer tube and extending beyond the end of said outer tube into which the handle of said lopping shear can be inserted, a plurality of slots through the wall of said sleeve, formed steel strips attached to the outside of said sleeve which, when deflected radially inward, can pass through said slots and into contact with said handle of said lopping shear, a tubular slide encircling said strips and sleeve by means of which said strips can be radially depressed and held in contact with said handle.

4,987,681

HAND HELD CORDLESS GRASS/WEED TRIMMER

Arnold L. Sepke, Hudson, Ill., assignor to White Consolidated Industries, Inc., Cleveland, Ohio

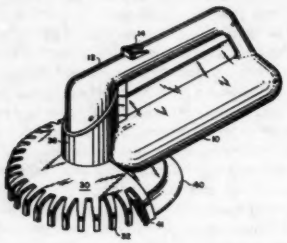
Filed Oct. 31, 1988, Ser. No. 264,389

Int. Cl.[5] B26B *25/00*

U.S. Cl. 30—276 **14 Claims**

1. In a hand-held cordless grass/weed trimmer having a housing, a power source in said housing, a motor in said housing connected to said power source through a switch, a motor shaft, the improvement comprising; a motor hub removably attached to said motor shaft, a cutter element having a circular cutting path being a flexible cutting line or an interchangeable rectangular cutting blade, a mounting assembly for said cutter

element on said motor hub having separate means for selectively holding said flexible cutting line or said retangular cut-



ting blade by compression on said motor hub, and a guard member for said cutter element positioned adjacent to the cutting path of the cutter element.

4,987,682

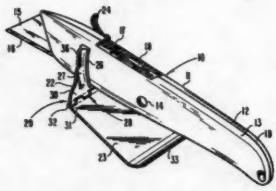
SAFETY DEVICE FOR UTILITY KNIVES AND THE LIKE

Debra K. Minnick, 13816 Leo Rd., Leo, Ind. 46765

Filed Jul. 17, 1989, Ser. No. 380,792

Int. Cl.[5] B26B *29/00*

U.S. Cl. 30—295 **13 Claims**



8. A knife and safety plate combination, comprising:

a knife body having an end, a bottom and a knife blade extending forwardly from the end of said body and having hinge means at the bottom for hingedly receiving a guard plate; and

a guard plate means hingedly connected to said body by said hinge means, said plate adapted to swing freely between a cutting position wherein said plate extends rearwardly from said hinge and from said blade and a guard position wherein said plate extends forwardly from said hinge and below said blade guarding the length of the blade against any cutting action.

4,987,683

PERFORATION HAND PUNCH

Heinz Brych, Diedenhofener Str. 22, 5500 Trier, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 390,367

Int. Cl.[5] B26F *1/04, 3/14, 1/00*

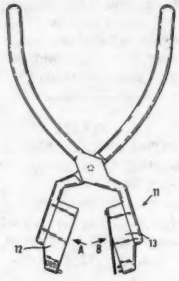
U.S. Cl. 30—363 **6 Claims**

1. A perforation hand punch for coding cards having,

a male-female perforation arrangement with planes oriented approximately parallel and opposite one another in a closed condition of the perforation hand punch, one of the planes having a first coding field with a multiplicity of punched holes and the other plane having a coding field with a multiplicity of corresponding receiving holes for punch pins situated perpendicular to the plane, and

two locating pins provided at a longitudinal edge of one of the coding fields, wherein

(a) eight punched holes and eight receiving holes are arranged four in a row, and



(b) the locating pins have a larger spacing than required for a column of punched holes and receiving holes.

4,987,684

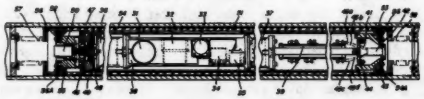
WELLBORE INERTIAL DIRECTIONAL SURVEYING SYSTEM

Ronald D. Andreas; G. Michael Heck; Stewart M. Kohler, and Alfred C. Watts, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 8, 1982, Ser. No. 415,941

Int. Cl.[5] G01C *9/00*

U.S. Cl. 33—304 **11 Claims**



1. A borehole survey apparatus comprising:

a housing;

means for selectively moving and stopping said housing along a borehole, said housing being subjected to angular rotations as a result of this movement;

angular measurement means, including a plurality of gyroscopes supported in said housing, for measuring the angular rate of rotation of said housing and producing angular signals indicative thereof;

acceleration measurement means, including a plurality of accelerometers mounted in said housing, for measuring inertial accelerations applied to said housing and producing acceleration signals indicative thereof;

single gimbal platform assembly means contained within said housing for supporting all said gyroscopes and said accelerometers, said platform assembly means having only a single axis of rotation aligned with said housing;

servo means responsive to said angular signals for preventing rotation of said platform assembly means relative to said borehole while said housing is rotating; and

computing means for

calculating the position of said housing within said borehole from said angular and acceleration signals and producing position information indicative thereof; and

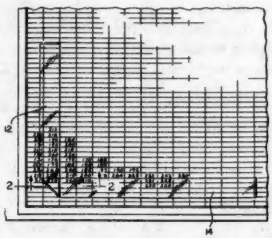
estimating system errors using Kalman estimation techniques while said housing is stopped; and modifying said position information to compensate for said estimated system errors, said position information forming a survey of said borehole.

4,987,685

FOLDABLE ACCOUNTING GUIDE

Jeanne E. Libit, 2119 C. North Monroe St., Arlington, Va. 22207

Filed Feb. 6, 1990, Ser. No. 475,798
Int. Cl.[5] B43L 7/06
U.S. Cl. 33—478 4 Claims



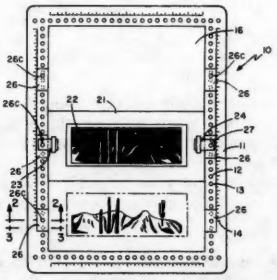
1. A guide comprising a pair of elongated, narrow, thin strip-like components constructed of flexible, resident, stiff material, a transverse hinge means interconnecting adjacent ends of the components enabling the components to be pivoted about an axis perpendicular to the components to enable the components to be oriented in alignment and extended end-to-end relation and in alignment and overlying superimposed relation and an angular hinge means forming a hinge axis at 45°in relation to the longitudinal axis of the components with one end of the angular hinge means intersecting the transverse hinge means at one end thereof with the other end of the angular hinge means terminating in spaced relation to the other end of the transverse hinge means to form a triangular member between the hinge means which can pivot to positions overlying and underlying a triangular portion of an adjacent end portion of each component and pivot to a position with the triangular member sandwiched between triangular portions of adjacent end portions of said components to enable the components to be oriented in perpendicular relation, said triangular member having a width and thickness equal to the width and thickness of the strip-like components.

4,987,686

STEP AND REPEAT APPARATUS

Gretchen Ternes, Shoreview, Minn., assignor to Ternes-Burton Company, Roseville, Minn.

Filed Nov. 28, 1988, Ser. No. 276,892
Int. Cl.[5] G01D 21/00
U.S. Cl. 33—623 7 Claims



1. In an apparatus for positioning a film transparency with respect to a surface, said apparatus including a bed, a registering device arranged along at least one side of said bed and having a length, said registering device having a plurality of indexing holes of like configuration spaced at regular intervals along said length, the improvement wherein said bed comprises:

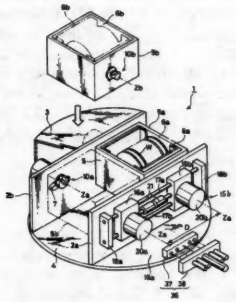
at least one vinyl sheet having an exposed upper surface of level hair-line cell structure, said level hair-line cell structure being composed of a plurality of peaks and a plurality of valleys, said plurality of valleys each having an average depth of between 0.001 and 0.008 inches, and further wherein said vinyl sheet has a thickness of about 0.03 inches.

4,987,687

ROTARY WAFER DRIER

Kenji Sugimoto, Shiga, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Sep. 27, 1989, Ser. No. 413,331
Claims priority, application Japan, Sep. 27, 1988, 63-126606[U]
Int. Cl.[5] F26B 17/24
U.S. Cl. 34—58 8 Claims



1. A rotary wafer drying apparatus, comprising:

a rotating means for rotating about a prescribed position as a center;

a plurality of supporting means provided on said rotating means;

container means supported by said plurality of supporting means, each for holding a plurality of wafers;

said supporting means being arranged such that said container means are balanced with respect to said center irrespective of rotation when said rotating means is rotated with said container means supported by said supporting means;

swinging means for swingably holding said container means between a first position and a second position different from said first position; and

means provided on said supporting means for releasably attaching said container means to said supporting means;

said supporting means comprising said swinging means;

said supporting means comprising a first member connected to said container means, and a second member having a connecting portion capable of swingably holding said first member between said first portion and said second position; and

said releasable-attachment means being for separating the connecting portion of said first and second members.

4,987,688

FRUIT-PROCESSING OVEN, PARTICULARLY FOR CONVERTING RAW PLUMS INTO PRUNES BY DESICCATION

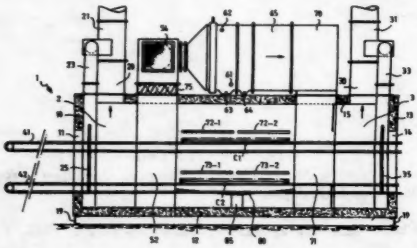
Gaston Petit, Cergy, and Daniel Monteiro, Laroque Timbaut, both of France, assignors to Auximat-Levage, Marines, France

Continuation of Ser. No. 440, Nov. 5, 1987. This application Jun. 30, 1988, Ser. No. 213,878

Claims priority, application France, Nov. 5, 1986, 86 15417

Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—69 5 Claims



1. A fruit-processing oven for drying and converting raw fruit by desiccation comprising an enclosure (1) provided with means for heating air, trays for supporting fruit and means for agitating air, characterized in that said enclosure (1), which has a double heat-insulated wall (10-17), is defined as a tunnel provided with means (2,3) for forming an air curtain at its entrance and at its exit, and in that said air agitation means (50-73) recirculate all of the air within said enclosure, after filtration (57) and condensation of water vapor (60) on a cold all, and blower means including nozzles (72, 73) for directing recirculated air toward the upper and/or lower portions of said trays.

4,987,689

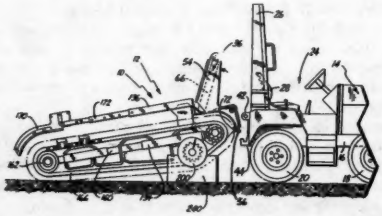
TRENCHING ATTACHMENT MOUNTING METHOD

Wally L. Kaczmarski; Verne W. Watts; Orlan J. Loraas, all of Lisbon; Curtis W. Vosberg, Wyndmere, and Joseph M. Mather, Lisbon, all of N. Dak., assignors to Clark Equipment Company, South Bend, Ind.

Division of Ser. No. 394,375, Aug. 15, 1989. This application Feb. 2, 1990, Ser. No. 473,872

Int. Cl.[5] E02F *1/00*

U.S. Cl. 37—195 10 Claims



1. For use with a trencher of the type including a trenching attachment having a mounting frame with upper mount member-engaging portions and lower mount member-engaging portions and removably mounted to mounts having upper and lower mount members on an end of a power unit, a trenching boom assembly pivotally mounted with respect to the mounting frame, and a cylinder for raising and lowering the boom assembly with respect to the frame; a method for attaching the trenching attachment to the power unit, including:

supporting the trenching attachment on the ground;

moving the power unit to a position next to the trenching attachment with the lower mount member-engaging portions of the mounting frame adjacent the lower mount members of the power unit;

actuating the cylinder in a first direction to rotate the mounting frame with respect to the boom assembly;

engaging lower mount members of the power unit with the lower mount member-engaging portions of the mounting frame;

further actuating the cylinder in the first direction to rotate the mounting frame with respect to the boom assembly and the power unit;

engaging the upper mount members of the power unit with the upper mount member-engaging portions of the mounting frame; and

actuating the cylinder in a second direction to raise the trenching boom assembly off the ground.

4,987,690

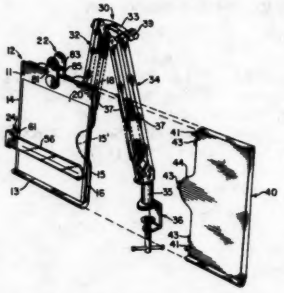
CONVERTIBLE SWING ARM AND DESK TOP COPY HOLDER

Eric R. Aaldenberg, Bayside, and Andrzej L. Soporowski, Freeport, both of N.Y., assignors to Esselte Pendaflex Corporation, Garden City, N.Y.

Filed Oct. 28, 1987, Ser. No. 114,188

Int. Cl.[5] B41J *11/00*

U.S. Cl. 40—341 19 Claims



1. A convertible copy holder comprising:

a copy support structure for supporting a document on a front copy support surface thereof, said structure having a pair of support tracks on a rear surface thereof, which support tracks have lateral projections extending toward a center axis of the support tracks, said support tracks being closed at a first end to form a stop at the upper end thereof;

an attachment means having a pair of attachment tracks on a forward surface thereof, which attachment tracks have lateral projections extending away from a center axis of the attachment means, which attachment tracks are further adapted to interlock with the support tracks while allowing sliding movement with respect up to said stop; and

holder means for holding said attachment means, at least in part, in a selected position.

4,987,691

DEVICE SYSTEM FOR A DISPLAY PANEL CAPABLE OF DISPLAYING A PLURALITY OF IMAGES SUCCESSIVELY

Jac H. J. Kessels, and Harry J. M. Weekers, both of Weert, Netherlands, assignors to Koninklijke Smeets Offset B.V., Netherlands

Filed May 12, 1989, Ser. No. 350,931

Claims priority, application Netherlands, Feb. 2, 1989, 8900257

Int. Cl.[5] G09F *11/02*

U.S. Cl. 40—506 **6 Claims**

1. A drive system for a display panel comprising a plurality of triangular columns, each of said columns having a longitudinal axis, wherein said columns are mounted for rotation about their corresponding longitudinal axes and positioned in a parallel, juxtaposed relationship, each of the columns being provided at one end thereof with a substantially triangular rotation element so as to form a plurality of successive rotation elements, said system also having displacement means driven by a common drive unit for rotating the successive rotation elements consecutively through an angle of approximately 120°, characterized in that:

each of said rotation elements has a plurality of corners and a concave side situated between two adjacent ones of said corners; and

the displacement means comprise:

an endless belt coupled with said common drive unit and provided with at least one slot extending longitudinally through the belt, wherein said slot is adapted to engage a belt-facing portion of successive ones of said rotation elements situated near one of said corners thereof in order to successively rotate each one of rotation elements; and

a leading element associated with said slot and having a free end projecting therefrom and oriented towards one of said rotation elements, wherein said leading element is disposed on said belt at an interspace ahead of the slot such that as said belt travels said projecting end of said leading element engages with a portion of one of said corners of said one rotation element so as to cause a portion of a preceding one of said corners of said one rotation element to rotate into said slot after which said preceding corner portion is conveyed by movement of an end edge of said slot until said one rotation element rotates through an angle of approximately 120°.

4,987,692

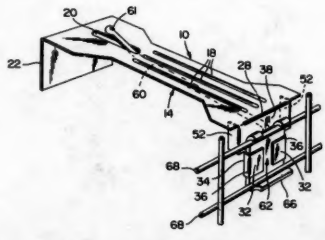
MERCHANDISE TAG FOR WIRE ROD OR FLAT CROSSBAR HOOK

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed May 3, 1989, Ser. No. 346,697

Int. Cl.[5] A47G *29/10*

U.S. Cl. 40—657 **10 Claims**



1. A product information display tag for presenting product information at a distal end of an elongate product support hook, the tag comprising an elongate strip of sheet material having a proximal end mounting portion for securing same at a proximal end of a hook, and an elongate intermediate portion extending from the mounting portion to extend over the hook and provide product information at a distal end thereof, wherein the mounting portion comprises a fold-down panel having a substantially centrally located aperture, laterally extending fold-back wings extending from opposite sides of said panel, and areas of contact adhesive at least on surfaces of the wings adapted to face inwardly when the wings are folded back.

4,987,693

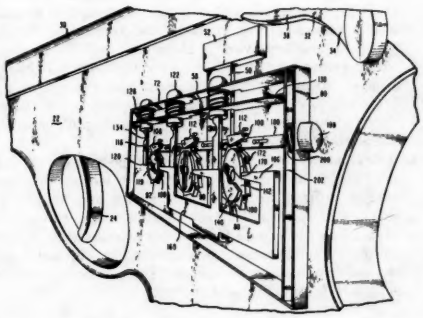
FIREARM SAFETY MECHANISM

Frank Brooks, 7689 SE. Rivers Edge St., Jupiter, Fla. 33458

Filed Jun. 6, 1988, Ser. No. 202,988

Int. Cl.[5] F41A *17/04*

U.S. Cl. 42—70.11 **22 Claims**



1. A firearm safety lock, comprising:

combination entering means accessible from the exterior of the weapon;

an engagement portion movable between a locked position in which the engagement portion operatively engages a movable portion of the firing mechanism to prevent discharge of the firearm, and an unlocked position permitting operation of the firearm;

at least one lock member disposed between the combination entering means and the engagement portion, the lock member being adapted to prevent movement of the engagement portion from the locked position to the unlocked position, the lock member being movable to a position where movement of the engagement portion to the unlocked position is permitted, and comprising at least one sprocket having a plurality of sprocket teeth, said combination entering means being adapted to engage said sprocket to cause rotation thereof, the engagement portion comprising at least one protrusion adjacent to each sprocket, each sprocket having channel means, movement of said sprocket by said combination entering means a predetermined number of times aligning said channel means with said protrusions, whereby said protrusions can be moved into said channel means and said engagement portion can be moved from the locked position to the unlocked position.

4,987,694

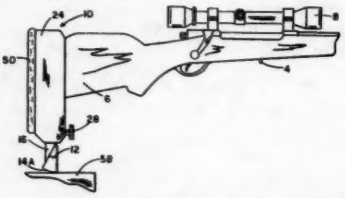
GUN REST FOR CONTROLLING THE BUTTSTOCK

Philip C. Lombardo, 16422 Lassen St., Sepulveda, Calif. 91343

Continuation-in-part of Ser. No. 320,710, Mar. 8, 1989, Pat. No. 4,876,814. This application Oct. 26, 1987, Ser. No. 427,487

Int. Cl.[5] F41A *23/06*

U.S. Cl. 42—94 9 Claims



1. A portable and adjustable gun rest for supporting and controlling a buttstock of a firearm comprising:

a vertical support assembly including a horizontal rigid base disposed transversely to the orientation of said firearm, having top and bottom surfaces, and front and rear sides;

an upwardly extending elongated support member issuing from and rigidly affixed to said base and effectively shaped and dimensioned to provide a rigid and secure vertical support;

a vertical adjustment means of sufficient dimension to receive an aperture through its vertical length and cooperatively interconnected with said elongated support member through said aperture, enabling said vertical adjustment means to raise and lower in elevation;

a cradle means comprising an inverted U-shaped bracket disposed to engage the uppermost rear portion of said buttstock, and a connecting means effectively dimensioned and positioned to rigidly affix said cradle means to said vertical adjustment means; and

a harness means comprising a flexible type material of sufficient length to encircle said buttstock issuing from and securely affixed to said cradle means, and a fastening means affixed to at least one end of said flexible type material, whereby said firearm can be releasably secured within said cradle means, providing a firm and stable rear rest, while allowing a shooter and ease of maneuverability necessary for sighting and shooting.

4,987,695

RETRACTABLE BARBLESS FISHING LURE

Herbert W. Preiser, 510 Oak Knoll, Barrington, Ill. 60010

Filed Jun. 5, 1990, Ser. No. 533,474

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.41 16 Claims

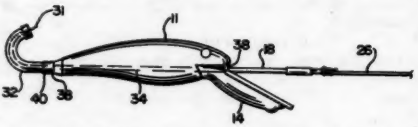
1. A terminal tackle sport fishing device comprising:

a body having a front end and a rear end, said body also having a longitudinal channel between said front and rear ends;

a shank having a one end and an other end, said shank also having an outer diameter less than the inner diameter of said longitudinal channel, and extending through said longitudinal channel such that said one end and said other end of said shank project from said front and rear ends of said body, respectively;

means for attaching said one end of said shank to a fishing line;

a barbless bend portion integral with said other end of said shank and having a sharpened point at a terminal other end thereof; and



a deformable sleeve adapted to slidably and substantially conceal said barbless bend portion.

4,987,696

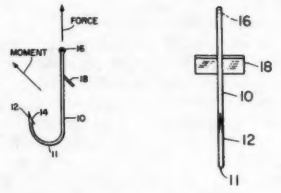
FISH HOOK CONSTRUCTION

Russell P. Cook, 22 Pinewood Rd., Wellesley, Mass. 02181

Filed Nov. 27, 1989, Ser. No. 441,638

Int. Cl.[5] A01K *83/00*

U.S. Cl. 43—43.16 2 Claims



1. A fish hook construction which comprises a hook shank, a hook barb attached to said shank and defining one end of said construction, a wing having a first portion rigidly secured to said shank positioned between 30 to 60 degrees from e hook shank in a direction toward a hook elbow and the plane of the wing being perpendicular to the plane defined by the shank and hook elbow, said wing having a free unsecured end and means for attaching a line to said construction.

4,987,697

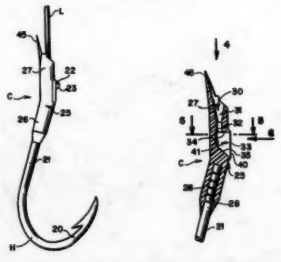
HOOK CONNECTOR

Gerald B. Klein, 13451 Stuart Ct., Broomfield, Colo. 80020

Filed Oct. 30, 1989, Ser. No. 429,044

Int. Cl.[5] A01K *91/04*

U.S. Cl. 43—44.83 6 Claims



1. In a rod-like connector having one end affixed to the shank of a fishhook, a passageway through the other end sized

to receive an end of a fishline threaded thereinto and a side opening in the connector connecting with the passageway through which the end portion of the line will project when threaded into the passageway, with the side opening forming a pocket proportioned to receive and hold a knot tied in the projected end portion of the fishline which is too large to be pulled through the passageway, the improvement wherein: said passageway entrance receiving the end of a fishline includes a section which is enlarged in diameter, with the section being of a funnel form to extend into the connector and to connect with a smaller short cylindrical passageway section which terminates at the aforesaid pocket.

4,987,698

MUSHROOM CULTIVATION

Kok-Kheng Tan, Singapore, Singapore, assignor to Everbloom Mushroom (PTE) Ltd., Singapore

Continuation-in-part of Ser. No. 57,335, Jun. 2, 1987, Pat. No. 4,833,821. This application Nov. 30, 1988, Ser. No. 277,823

Claims priority, application United Kingdom, Jun. 3, 1986, 8613360

Int. Cl.[5] A01G *1/04*

U.S. Cl. 47—1.1 **8 Claims**

1. A method of cultivating wood-decaying edible fungi, which comprises allowing spawn of the fungi to colonise and grow at about 25° C., on a substrate comprising comminuted wood which has been hydrated and rendered free of unwanted spores, and inducing fruiting by subjecting the spawn-run substrate to thermal shock comprising sequentially raising, lowering and raising the temperature, to 28–30° C., 10–15° C. and 20–25° C., respectively with the initial raising and lowering steps being of a duration of at least 1 day.

4,987,699

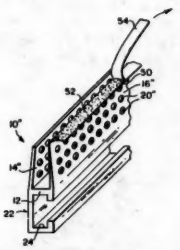
MOUNTING FOR AN AUTOMOTIVE WINDOW PANEL

Peter N. Gold, 465 N. Wood Ave., Rockville Centre, N.Y. 11570

Filed Aug. 24, 1989, Ser. No. 398,175

Int. Cl.[5] B60J *1/00*

U.S. Cl. 49—375 **9 Claims**



1. An improved mounting system for attaching an automotive window panel to a window regulating mechanism for raising and lowering the window panel, comprising:

a window panel mounting bracket for connecting the window panel to the window regulating mechanism having a horizontal base member and a pair of leg members having an outer surface and extending upwardly from said base member forming a generally U-shaped channel for receiving a bottom edge of the window panel, each of said upwardly extending leg members having at least one opening therein for receiving a curable adhesive applied between the bottom edge of the window panel and said mounting bracket to adhesively hold the window panel in said generally U-shaped channel, and a sufficient amount of said curable adhesive being applied to thereby form a supplemental mechanical interlock with the mounting bracket upon curing of the adhesive, wherein excess adhesive escaping through said openings is spread across the outer surface of said leg members to build-up and reinforce said leg members and at the same time to enhance the mechanical interlock provided by said adhesive.

4,987,700

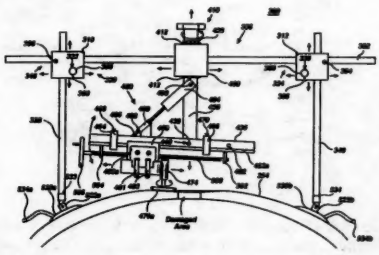
MECHANICAL SCARFING APPARATUS

Everett A. Westerman, Auburn, and Phillip E. Roll, Kent, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Dec. 13, 1988, Ser. No. 284,137

Int. Cl.[5] B24B *7/00*

U.S. Cl. 51—34 E **8 Claims**



1. An apparatus for producing a controller taper cut in a workpiece, comprising:

a plurality cross support members;

a plurality of vertical support members coupled to said cross support members said vertical support members for supporting said cross members in a fixed position over said workpiece;

a gantry member slidably disposed on said horizontal support members;

a rotatable vertical support member disposed within said gantry member in a position which is substantially parallel with respect to said plurality of vertical support members wherein said rotatable vertical support member includes means for adjusting the vertical position of said rotatable vertical support member within said gantry member;

a support beam pivotally attached to the distal end of the rotatable vertical support member at the approximate midsection of said support beam;

an adjustment member pivotally attached to the approximate mid-section of said rotatable vertical member and one end of the support beam for controlling the angular relationship of said support beam with respect to the cross axis defined by the cross support members;

a cutting tool means coupled to a mounting means slidably disposed on the support beam for moving the cutting tool means along the support beam.

4,987,701

ENDLESS BELT VALVE GRINDER

Marvin H. Humbert, Aberdeen, S. Dak., assignor to K. O. Lee Company, Aberdeen, S. Dak.

Filed Apr. 15, 1988, Ser. No. 181,982

Int. Cl.[5] B24B *15/04, 21/02*

U.S. Cl. 51—145 R **11 Claims**

1. Apparatus for grinding a valve member having a head, a stem, a stem axis and a frusto-conical valve on the valve head, which comprises:

a. a base;

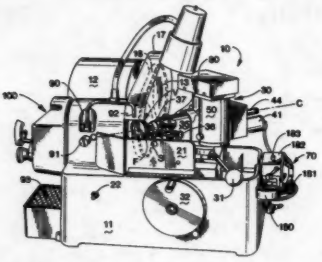
b. a generally cylindrical drive wheel mounted to the base for rotation about a first axis;

c. a generally cylindrical backing wheel mounted to the base for rotation about a second axis spaced from and parallel to the first axis;

d. an endless abrasive belt extending around the drive wheel and the backing wheel in engagement with the generally cylindrical surfaces thereof;

e. drive means for rotating the drive wheel about the first axis;

f. chuck means mounted to the base for gripping the valve stem, said chuck means including a collet for gripping the valve stem and a sleeve for compressing the collet, against the valve stem and stop means for abutting the chuck means thereby limiting movement of the sleeve and compression of the collet on the valve stem, and means for axially adjusting the stop means along the sleeve axis to thereby adjust the gripping force of the collet on the stem;



g. means for rotating the chuck means to thereby rotate the valve about the stem axis; and

h. means for moving the valve face into engagement with the endless abrasive belt during rotation of the valve and movement of the belt, to thereby grind the valve face.

4,987,702

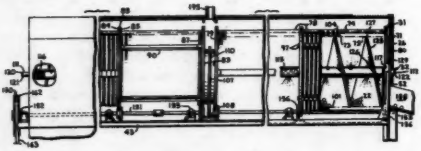
SURFACING MACHINE

Wayne H. Anschutz, Topeka, Kans., assignor to Seymour Foods, Inc., Topeka, Kans.

Filed Oct. 31, 1988, Ser. No. 264,904

Int. Cl.[5] B24B *31/02, 1/00;* D06F *37/02*

U.S. Cl. 51—164.1 **24 Claims**



1. A surfacing machine for discrete objects, which comprises:

(a) front and back ends;

(b) a longitudinal axis extending between said ends;

(c) a generally coaxial, cylindrical drum having:

(1) front and back ends;

(2) a bore extending between and open at said ends, said bore including an inner surface;

(3) an outer, cylindrical surface; and

(4) surfacing means comprising a plurality of annular bands of bristles, said bristles being fixedly connected together at said drum and extending radially inwardly and forming said drum bore inner surface;

(d) a generally coaxial screw auger extending at least partly through said drum bore and having front and back ends;

(e) frame means mounting said drum said screw auger for rotation generally about said longitudinal axis; and

(f) drive means drivingly connected to and adapted for rotating said drum and said screw auger.

4,987,703

METHOD OF AND APPARATUS FOR CHANGING MATERIAL REMOVING WHEELS IN MACHINE TOOLS

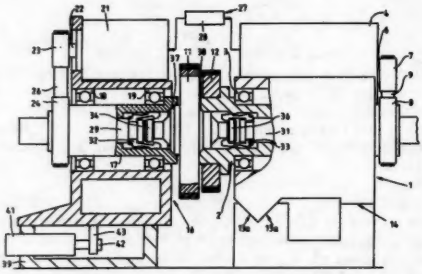
Jürgen Brill, Stuttgart, Fed. Rep. of Germany, assignor to Schaudt Maschinenbau GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 22, 1988, Ser. No. 223,427

Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724697

Int. Cl.[5] B24B *41/00*

U.S. Cl. 51—166 R **4 Claims**



1. A method of manipulating a material removing wheel which is mounted on the rotary spindle of a machine tool during removal of material from workpieces, comprising the steps of rotating the spindle; moving the spindle relative to a wheel carrier rotating at substantially the speed of the spindle, aligning the spindle axially with the wheel carrier, engaging the wheel with the wheel carrier, and disengaging the wheel from the spindle while the wheel rotates.

4,987,704

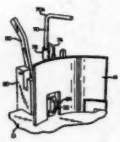
PLUNGE JOINTER FOR PLANER KNIVES

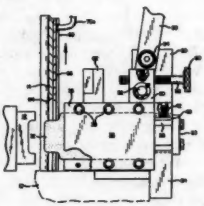
David J. Johnson, 19909 NE. Clackamas Ct., Portland, Oreg. 97230, and Charles L. Groghan, 2632 NE. 201st, Space 10, Troutdale, Oreg. 97060

Filed Jul. 31, 1989, Ser. No. 386,942

Int. Cl.[5] B24B *19/00*

U.S. Cl. 51—246 **7 Claims**





1. In a planar apparatus:

a frame, a rotatable knife head on said frame,

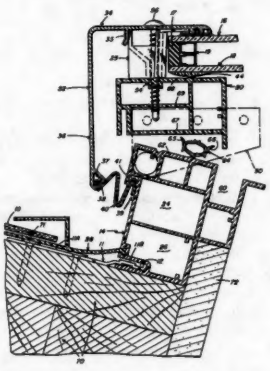
a guard wall on said frame adjacent said knife head,

a base member arranged to be secured to said support frame on a side of said guard wall opposite from said knife head,
slide means slidably mounted on said base member for movement toward and away from said knife head,
a jointing stone on said slide means having a jointing portion projecting from said slide means,
and lever means on said base member engageable with said slide means and arranged to move said slide means and stone toward and away from said knife head,
said lever means being arranged to move said slide means past said guard wall for engagement of the jointing stone with the knife head for jointing the knife head.

4,987,705
SKYLIGHT CONSTRUCTION

Robert Sampson, Sanford, and Sean Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Filed Dec. 13, 1988, Ser. No. 283,731
Int. Cl.[5] E04B *7/18*
U.S. Cl. 52—72 **26 Claims**



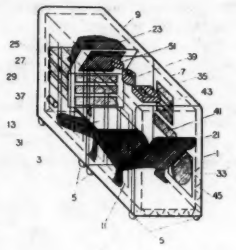
26. A skylight construction for an opening in a building or the like comprising: a frame means extending about the opening and including means securable about the opening, translucent or transparent means covering the opening and extending at edges to overlie the frame means, means for retaining the covering means on the frame means, said frame means comprising a curb frame, said means for retaining comprising a retainer, and a foldable gasket means having opposite ends each including securing means, said gasket means extending along at least one side of the curb frame, said retainer and said curb frame each having respective retaining means for receiving said respective securing means so as to anchor both ends of the gasket.

4,987,706
CONTROLLED-ENVIRONMENT ENTERTAINMENT CENTER

William E. Hughes, and Pamela K. Hughes, both of 238 N. 29th, Cornelius, Oreg. 97113

Filed Feb. 17, 1989, Ser. No. 311,816
Int. Cl.[5] E04H *1/12*
U.S. Cl. 52—79.5 **2 Claims**

1. A controlled-environment entertainment center comprising:
(a) an entirely enclosed sound-proof enclosure;
(b) a reclining chair mounted in said sound-proof enclosure;
(c) an audio-visual entertainment system mounted in said sound-proof enclosure;
(d) a door in the side of said sound-proof enclosure for convenient access to the interior thereof;
(e) decorative paneling or the like covering the exterior of said sound-proof enclosure; and

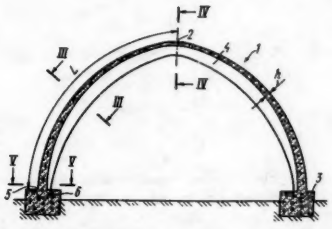


(f) sound speakers mounted on the exterior of said sound-proof enclosure for playing music or television audio in cooperation with said audio-visual entertainment system.

4,987,707
VAULTED BUILDING STRUCTURE

Vasily P. Kiselev, Moskovsky prospekt, 54, kv. 7; Nikolai P. Klimenko, ulitsa Putilovskaya, II, kv.9, and Alexandr A. Zakharov, ulitsa Generala Lizjukova, 28, kv. I2, all of Voronezh, U.S.S.R.

PCT No. PCT/SU88/00022, § 371 Date Sep. 27, 1989, § 102(e) Date Sep. 27, 1989, PCT Pub. No. WO89/07179, PCT Pub. Date Aug. 10, 1989
PCT Filed Jan. 27, 1988, Ser. No. 458,700
Int. Cl.[5] E04B *1/32, 7/08*
U.S. Cl. 52—88 **3 Claims**



1. A vaulted building structure having its shell (**1**) made of a composite construction material and formed of arcuate elements (**4**) of a uniform width having a convex outer surface, having their ends (**5**) mounted on a base, the shell being shaped as a cylindrical vault of which the vertical plane of symmetry includes the ridge (**2**) of the vault, characterized in that the ends (**5**) of the acruate elements (**4**) are hingedly braced to the base (**9**) for rotation about a horizontal axis parallel with the vertical plane of symmetry, the outer surface of each arcuate element (**4**) having its curvature gradually diminishing lengthwise of the arcuate element (**4**) toward the ends (**5**) and the ridge (**2**) thereby levelling out strains generated in the shell (**1**) in rotation of the ends (**5**) of the arcuate elements (**4**).

4,987,708
SEISMIC ANCHOR

Jeffrey S. Wilcox, Grand Rapids, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Sep. 21, 1989, Ser. No. 410,257
Int. Cl.[5] E04B *1/00, 1/98*
U.S. Cl. 52—126.6 **14 Claims**

1. An anchor for securely mounting an article of furniture to a support surface comprising:

a shank having a head at one end thereof and abutment means longitudinally spaced away from the head;

a mechanical fastener movably secured to the shank intermediate the head and the abutment means;

means for attaching the article of furniture to the shank, said means being adapted to be mounted to the article of furniture and having an opening received over the head of the shank; and

means positioned between the article attaching means and the head of the shank for selectively retaining the article attaching means on the shank;

whereby the mechanical fastener can be adjusted to bear against the article attaching means to securely mount the article of furniture to the support surface.

4,987,709

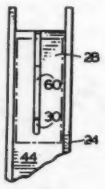
FRAME CONSTRUCTION SYSTEM

Carlo G. Bucci, Oakville, Canada, assignor to Repla Limited, Oakville, Canada

Filed Mar. 8, 1989, Ser. No. 320,337

Int. Cl.[5] A47G *1/10*

U.S. Cl. 52—127.7 **1 Claim**



1. In an aperture closing frame construction, a corner joint having a first frame member and a second frame member, each member being of hollow closed section terminating in mutually bevelled planar relation, with complementary angles of bevel, to form a tight, abutting joint having a predetermined included angle therebetween; the extruded sections forming mutually included closed channels having wall portions of the respective channels in mutual substantially adjoining relation to provide substantially continuous inner peripheral and outer peripheral surfaces; a joining member for insertion within said channels in oriented relation therebetween, comprising a planar strip having four adjoining, mutually inclined leg portions to provide a resilient open W-form, the centre leg portions of the W-form abutting a said section peripheral; surface in corner maintaining relation therewith; the other leg portions of said resilient W-form each extending in inclined pressing relation against a respective other said peripheral surface and having a sharp, transversely extending edge portion to contact said other peripheral surface in effective cutting contact therewith, to jam said W-form in nonwithdrawable, corner maintaining relation therewith, so as to retain said frame members in secured, joined relation; the at least one elongated access slot in a said frame member and penetrating said section outer peripheral surface, in use to permit the insertion of a tool therein, to disengage said joining member from said cutting relation with said channel inner surface and permit withdrawal of said joining member therefrom.

4,987,710

DAMPING DEVICE IN A STRUCTURE AND DAMPING CONSTRUCTION AND DAMPING METHOD USING THOSE DEVICES

Toshiyuki Noji, Chiba; Hidetoshi Yoshida, Tokyo; Eiji Tatsumi, Chiba; Shinichi Akao, Saitama, and Hideyuki Kosaka, Chiba, all of Japan, assignors to Mitsui Kensetsu Kabushiki Kaisha, Tokyo, Japan

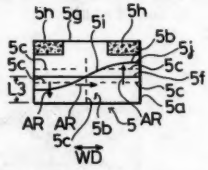
Division of Ser. No. 216,496, Jul. 8, 1988. This application Nov. 21, 1989, Ser. No. 439,938

Claims priority, application Japan, Dec. 1, 1987, 62-305379; Dec. 24, 1987, 62-327650; Mar. 22, 1988, 63-67950

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.[5] E02D *27/34*

U.S. Cl. 52—167 DF **1 Claim**



1. A damping device for absorbing vibrations of a structure said damping device comprising:

an elongated vessel for containing a liquid therein such that movement of the vessel will create a wave motion of the liquid surface in the elongated direction of said vessel;

a plurality of damping members disposed inside said vessel for damping the sloshing of the liquid inside said vessel, said plurality of damping members comprising a plurality of meshes, including one said mesh vertically disposed in a central portion of said vessel and horizontal said meshes disposed at end portions of said vessel; and

wave dissipation means for dissipating the wave motion of the liquid in said vessel.

4,987,711

DAMPING DEVICE IN A STRUCTURE AND DAMPING CONSTRUCTION AND DAMPING METHOD USING THOSE DEVICES

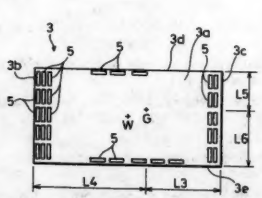
Toshiyuki Noji, Chiba; Hidetoshi Yoshida, Tokyo; Eiji Tatsumi, Chiba; Shinichi Akao, Saitama, and Hideyuki Kosaka, Chiba, all of Japan, assignors to Mitsui Kensetsu Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 361,858, Jun. 5, 1989, abandoned. This application Mar. 14, 1990, Ser. No. 493,154

Claims priority, application Japan, Dec. 1, 1987, 62-305379; Dec. 24, 1987, 62-327650; Mar. 22, 1988, 62-67950

Int. Cl.[5] E02D *27/34*

U.S. Cl. 52—167 DF **1 Claim**



1. A damping arrangement on a structure for absorbing vibrations of said structure, said structure having a center of rigidity and a center of gravity, said center of rigidity being offset relative to said center of gravity in a horizontal direction, said damping arrangement comprising:

a plurality of damping devices disposed on an upper portion of said structure, each said damping device comprising an elongated liquid vessel, a liquid disposed inside said elongated liquid vessel such that the surface of said liquid forms a wave motion in the direction of elongation of said elongated liquid vessel, and damping members for damping movement of said liquid in each said elongated liquid vessel;

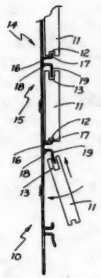
wherein said plurality of damping devices are disposed on said upper portion of said structure such that there are fewer said damping devices on a side of said center of rigidity away from said center of gravity than there are on the opposite side of said center of rigidity.

4,987,712

BRICK CLADDING ASSEMBLY

Noel A. M. Mancuso, Ingleburn, Australia, assignor to Empire Brick Pty Limited, Ingleburn, Australia

Filed May 17, 1989, Ser. No. 353,767
Int. Cl.[5] E04F *13/08, 13/12*
U.S. Cl. 52—387 **5 Claims**



1. A mounting plate for a brick cladding assembly, which assembly includes a plurality of tiles to be supported by the plate, with each tile having a pair of parallel edge faces, and with each edge face having a slot so that the slots are parallel, said plate being of a generally planar rectangular configuration, and having a plurality of mounting flanges extending from the general plane of the plate and adapted to supportably engage the tiles by engagement within the slots thereof, and wherein the mounting flanges comprise two sets of flanges, each set of flanges extending along a line so that the two lines of flanges are generally parallel, a first one of said sets including flanges to be engaged by the tile with inclined flange portions projecting at an acute angle away from the general plane of the plate so that upon installation of one of the tiles thereon by location within one of the slots thereof, the flange portion is resiliently deformed to securely engage the tile when the other slot thereof is engaged, after the flange of said one set, with a corresponding one of the flanges of the other set.

4,987,713

TECHNIQUE FOR MOUNTING PANELS FOR FURNITURE

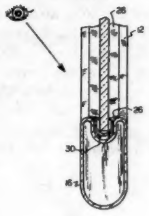
Fredrick B. Delafield, 2406 Goldfield Ct., Greensboro, N.C. 27408

Filed Oct. 21, 1988, Ser. No. 260,916
Int. Cl.[5] E04B *1/62*
U.S. Cl. 52—400 **36 Claims**

1. A frame and strip assembly for mounting an edge portion of a panel, comprising;

(a) a frame member having a channel-like recess therewith for receiving the edge portion of the panel; and

(b) a mounting strip adapted to be received in said recess, said strip having a base and a pair of opposed side walls defining a generally U-shaped cross section, said side walls having a substantially smooth surface of a sufficiently high durometer value adapted to slide freely in said frame member, wherein the upper portion of each of said side walls of said mounting strip defines a transversely and outwardly extending flange, whereby said outwardly extending flanges and said side walls of said mounting



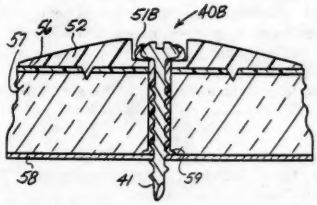
strip are adapted to be in substantially continuous and coextensive engagement with said frame member adjacent to said recess to suspend the edge portion of the panel in said frame member, thereby preventing physical contact between the panel edge and said frame member.

4,987,714

METHOD FOR INSTALLING A ROOF FASTENER

Stuart H. Lemke, 349 River Bluff, Mosinee, Wis. 54455

Continuation-in-part of Ser. No. 236,542, Aug. 25, 1988, abandoned, and a continuation-in-part of Ser. No. 236,666, Aug. 25, 1988, Pat. No. 4,834,600. This application Jul. 25, 1989, Ser. No. 385,256
Int. Cl.[5] E04D *5/14*
U.S. Cl. 52—410 **33 Claims**



1. A method of installing a roofing structure on a roof, said method employing a roofing fastener including a plate and a screw having a threaded body and an enlarged diameter flanged head, said screw being received through a stepped hole in said plate, comprising:

rotating said screw to effect engagement with said roof so that said plate is tightened down against said roofing structure, and said threaded body passes through said roofing structure and engages said roof;

by frictional interaction of said screw and plate during a final segment of said rotating step, spin-welding a surface of said screw with a surface of said plate to secure said screw and said plate against said roofing structure; and

abruptly stopping rotation of said screw, whereupon said flanged head of said screw engages said step of said hole.

4,987,715

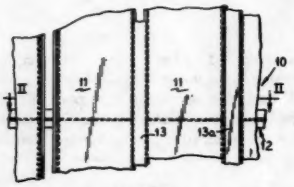
PARALLEL BEAM SYSTEM

James J. Dunn, Charles, Ill., assignor to Chicago Metallic Corporation, Chicago, Ill.

Filed Mar. 31, 1986, Ser. No. 846,004
Int. Cl.[5] E06B *7/08*
U.S. Cl. 52—489 **8 Claims**

1. A system for covering a surface to form a wall surface

selected from horizontal and vertical walls, said system comprising a plurality of beam elements, each beam element having a main face portion with two sides, a leg portion along each side terminating in a flange extending substantially parallel to the face portion, said face portion and leg portions forming a substantially U-shaped cross-section with the face portion being a bight portion extending between the parallel leg portions, each of the leg portions at a fixed distance from the flange having a pair of longitudinally extending creases to form an internal shoulder facing an inner surface of the face portion and an outer shoulder facing the flange; means for mounting the beam elements to extend parallel with a prescribed spacing between the leg portions of adjacent beam elements, said means for mounting including at least two sets of fastening elements with each fastening element having a pair of oppo-



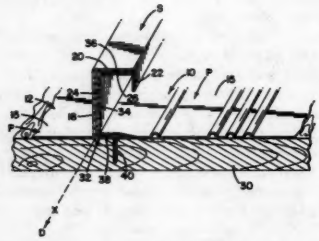
sitely facing hooks for engaging the pair of internal shoulders of the beam element and means spacing the fastening elements of each set with the desired spacing therebetween to obtain the prescribed spacing between leg portions of adjacent beam elements; and a filler element for assembly between each pair of beam elements, each filler element having a U-shaped cross-section with a flat, planar bight portion and a pair of parallel extending legs having edges, each leg being substantially planar and having a crease spaced inward from said edge at a distance equal said fixed distance to form a single, outwardly extending catch surface, said filler element being snapped into the space between leg portions of adjacent beam elements and the catch surfaces engage the external shoulders of the leg portions to hold the filler element in place as the edges of the legs of said filler element engage the flanges of the beams.

4,987,716

ROOFING SYSTEM USING STANDING SEAM JOINTS

Thomas J. Boyd, Wellsburg, W. Va., assignor to The Louis Berkman Company, Steubenville, Ohio

Filed Oct. 2, 1989, Ser. No. 415,554
Int. Cl.[5] E04B *1/06*
U.S. Cl. 52—520 **9 Claims**



1. In a sheet metal roof assembly including a plurality of roof panels inclined in a generally horizontal plane having vertically extending edge flange portions, said edge flange portions having edge sections at the upper ends thereof, said panels positioned adjacent one another so that an edge flange portion of one panel is disposed adjacent and parallel to the edge flange portion of another panel and the edge section of one of said adjacent panels is folded over and around the edge section of the other adjacent panel to define a standing seam joint, the improvement comprising:

a continuous sheet metal cleat interposed between said edge flange portions of said adjacent panels and having an upper edge section folded together with the said folded over edge sections of said edge flange portions to define a seven ply standing seam which extends the length of said standing seam and is comprised solely of plies of said panel edge flange portions and said cleat,

said folded edge sections of said edge flange portions and said cleat being compressed flatwise together in a tight flattened press fit contact with each other under a pressure of at least about 1,000 pounds per square inch of their surface contact area such that substantially no space exists between said edge sections in said standing seam, and

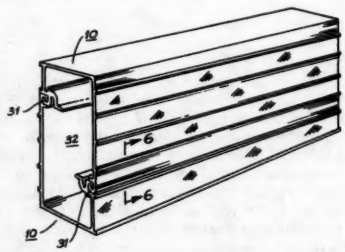
gasket means of compressible and plastically deformable solidified material within and compressively deformed between said folded edge sections of said edge flange portions and cleat for sealing said joint without the application of heat whereby a soldered, completely sealed and weld-free flattened standing seam joint results to permit an improved roofing assembly to be installed for roofs with little pitch.

4,987,717

GUTTER FACIA DESIGN ADAPTED FOR USE IN BOX BEAM APPLICATIONS

Joseph T. Dameron, Jr., 3357 E. Pennsylvania St., Tucson, Ariz. 85714

Filed Nov. 20, 1987, Ser. No. 123,557
Int. Cl.[5] E04C *3/30*
U.S. Cl. 52—731 **2 Claims**



1. A box beam apparatus, said apparatus comprising:

(a) a first and second, substantially L-shaped, interlocked patio cover gutter facia, each gutter facia including: a first side member, said first side member being elongated and having an upper terminating end, a second side member, said second side member being elongated and having a height lower than said first side member and also having an upper terminating end, a first, substantially F-shaped, locking member of a lock design, said first, substantially F-shaped, locking member being located at said upper end of said first side member, and a second, substantially F-shaped, locking member of a lock design, said second F-shaped locking member being located at said upper end of said second side member, an elongated screw groove provided on said second side member adjacent to said second, substantially F-shaped locking member, said screw groove being used for attaching said gutter facia to an underside of a roof when said gutter facia is to be used as a gutter facia and said first and second F-shaped locking members being used in forming said box beam apparatus; and

(b) at least two locks, said locks being created by interlocking ssid first and second, substantially F-shaped locking members on said first gutter facia, respectively with, a second and first, substantially F-shaped, locking member on said second identical gutter facia.

4,987,718

POLE REINFORCEMENT SYSTEM

John K. Knight, Doncaster, Australia, assignor to Eltek Holdings Pty., Ltd., Victoria, Australia

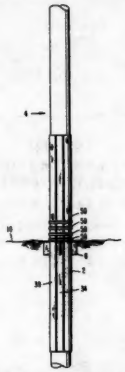
PCT No. PCT/AU87/1379, § 371 Date Jun. 12, 1989, § 102(e) Date Jun. 12, 1989, PCT Pub. No. WO88/03593, PCT Pub. Date May 19, 1988

Filed Jun. 12, 1989, Ser. No. 378,516

Claims priority, application Australia, Nov. 12, 1986, PH8925/86

Int. Cl.[5] E04G *23/04*

U.S. Cl. 52—742 **5 Claims**



1. A method of reinforcing a pole having a buried end, the method comprising the steps of placing a first elongate reinforcing member adjacent to the pole, said elongate member being curved in transverse cross-section so as partly surround the periphery of the pole, driving the member downwardly so that its lower portion is embedded in the ground adjacent to the buried end of the pole, placing a second elongate member adjacent to the pole, said second elongate member being curved in transverse cross-section so as to partly surround the periphery of the pole and being located so that one edge region thereof overlaps one edge region of the first member, driving the second elongate member so that its lower portion is embedded in the ground adjacent to the buried end of the pole and fixing the first and second members to the pole, placing a third elongate member adjacent to the pole, said third elongate member being curved in transverse cross-section so as to partly surround the periphery of the pole and being located so that edge regions thereof overlap with edge regions of both the first and second members, driving the third elongate member into the ground so that its lower end portion is embedded in the ground adjacent to the buried end of the pole and fixing the third member to the pole, and providing restraining means about the pole so as to clamp the members against the pole white they are being driven downwardly said restraining means not being connected to the members for longitudinal movement therewith.

4,987,719

REINFORCED CONCRETE BUILDING CONSTRUCTION AND METHOD OF FORMING SAME

Albert A. Goodson, Jr., 13923 Myrtlea, Houston, Tex. 77079

Filed Dec. 29, 1988, Ser. No. 290,370

Int. Cl.[5] E04B *1/16*

U.S. Cl. 52—743 **9 Claims**

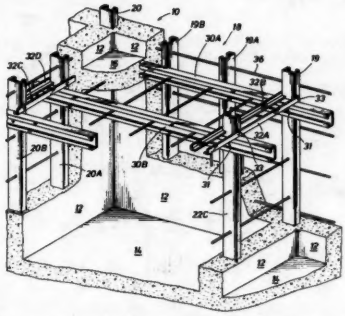
1. A method of building a continuous non-modular reinforced concrete wall in situ comprising the steps of:

constructing a steel framing form of a plurality of spaced parallel steel framing members with said steel framing members being of a channel shape including a web with flanges extending therefrom, said steel framing members being of a thickness between 1/32 inch and ¾ inch;

mounting transversely extending reinforcing members on said steel framing members;

positioning a backing form adjacent flanges of said steel framing members on one side of said steel framing form;

mounting a plurality of spaced connectors between said backing form and said adjacent flanges for removably securing said backing from onto said steel members and spacing said backing form at least ¾ inch from said adjacent flanges;



pneumatically applying concrete against said backing form only from the other side of said steel framing form of a thickness sufficient to cover said transversely extending reinforcing members and said adjacent flanges; and

removing said backing form and said connectors from said steel members after setting of said concrete thereby to provide a panel construction about said adjacent flanges on one side of said steel framing form for forming the continuous reinforced concrete wall.

4,987,720

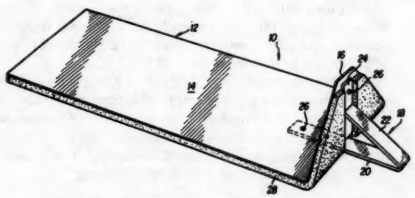
NON-SKID HOLDER FOR SHINGLES FOR USE ON A PITCHED ROOF

John C. Wozney, Jr., 6827 Jerome St., Springfield, Va. 22150

Filed Feb. 23, 1990, Ser. No. 483,718

Int. Cl.[5] E04D *15/00*; E04F *21/00*; E04G *21/14*

U.S. Cl. 52—749 **7 Claims**



1. A non-skid holder for shingles for use on a pitched roof which comprises:

a. a base member formed from sheet material having an upturned portion at one end to form a corner with said base member,

i. said base member providing a stacking surface for shingles,

b. a handle member secured to said upturned portion and to the bottom of said base member,

c. and a non-skid member secured to at least a portion of the undersurface of said base member and extending for substantially the entire length of said base member in said secured portions,

i. said non-skid member adapted to be placed on a pitched roof surface.

4,987,721

METHOD OF AND APPARATUS FOR THE STERILIZATION OF STACKED PACKAGING ELEMENTS

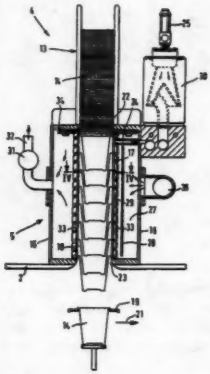
Alfons Turtschan, Schwäbisch Hall, Fed. Rep. of Germany, assignor to Gasti Verpackungsmaschinen GmbH, Schwabisch Hall, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 463,040

Claims priority, application Fed. Rep. of Germany, Jan. 10, 1989, 3900448

Int. Cl.[5] B65B *55/24, 65/08;* B65H *3/28;* A61L *2/00*

U.S. Cl. 53—167 17 Claims



1. A method of sterilizing stacked packaging elements selected from the group of packaging cups and packaging lids, comprising the steps of:

(a) providing a stack of said packaging elements with successive elements of the stack in mutual contact;

(b) advancing said elements of said stack in succession through a sterilizing chamber while mutually spacing successive ones of said elements apart;

(c) contacting the elements of said stack as they are advanced through said sterilizing chamber with a sterilizing fluid which passes around and between said elements and through spaces between said elements as said elements are advanced through said sterilizing chamber;

(d) during advancing of said elements through said sterilizing chamber and while said elements are contacted with said sterilizing fluid, periodically accelerating successive elements apart from one another at least once while said elements are in said chamber; and

(e) following acceleration of successive elements apart from one another in step (d), rapidly bringing successive elements toward one another while maintaining said successive elements apart and without contact between them to effect a pumping action on said sterilizing fluid intensifying contact of said fluid with said elements.

4,987,722

HAND-HELD BOTTLE CAP CRIMPER

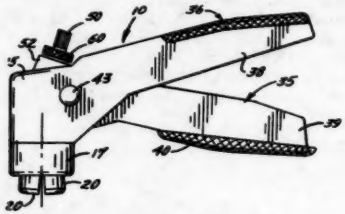
Richard J. Koebbeman, 4910 Kilburn Ave., Rockford, Ill. 61101

Filed Aug. 31, 1989, Ser. No. 401,430

Int. Cl.[5] B65B *7/28;* B21D *9/08;* B23P *11/00*

U.S. Cl. 53—353 7 Claims

1. A hand-held tool for crimping a cap onto the top of a container, said tool comprising a body having a lower end portion, a plurality of crimping jaws supported on the lower end portion of said body to move between open and closed positions, an upper handle fixed to said body and located above said jaws, a lower lever located beneath and pivotally connected to said handle, and means carried by said body and connected to said lever for causing said jaws to pivot to said closed position when said handle and said lever are squeezed and said lever is pivoted upwardly toward said handle, said means comprising a screw threaded into said lever, said screw



being adjustable to change the initial position of the lever relative to said handle.

4,987,723

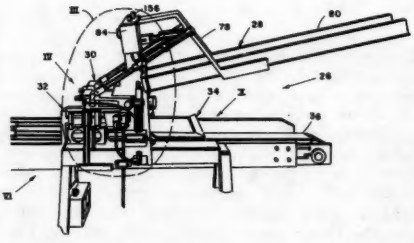
METHOD AND APPARATUS FOR STRIPPING TAGS FROM DIE CUT SHEETS

Gordon J. Diemer, Grand Ledge, Mich., assignor to The John Henry Company, Lansing, Mich.

Filed Mar. 9, 1989, Ser. No. 320,990

Int. Cl.[5] B65B *13/02*

U.S. Cl. 53—399 29 Claims



18. A method for producing bundles of blanks for a stack of die cut sheets including the steps of:

clamping portions of a stack of die cut sheets on opposite sides of a common cut line adjacent the location of the cut line;

rotating said portions about he common cut line with respect to each other about an axis parallel to the plane of said sheets in order to sequentially separate individual sheets at said cut line;

applying a force transverse the plane of the die cut sheets adjacent the cut line concurrently with said step of rotating; and

tying batches of blanks after said step of rotating.

4,987,724

METHOD OF PACKAGING CHRISTMAS LIGHTING

Cathy O. Rutherford, 4201 Conowingo Rd., Darlington, Md. 21034

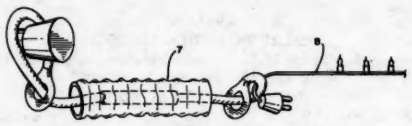
Filed Oct. 23, 1989, Ser. No. 424,995

Int. Cl.[5] B65B *5/04, 13/02, 67/04;* B23P *19/02*

U.S. Cl. 53—399 11 Claims

1. The method of packaging electric wiring oriented horizontally in extended condition, comprising placing a flexible longitudinal sleeve of considerably greater diameter than said wiring between an upstanding immobile fixture and adjacent to and in the path of said electric wiring, attaching one end of a supple serpentine like grasping tool to said immobile fixture, bunching said sleeve to shorten it, and pulling the tool through the sleeve so that a second end of said tool is adjacent the electric wiring, attaching said second end to one end of said

electric wiring, extending and pulling the sleeve over said electric wiring until said wiring is completely ensleeved, disengaging the ends of said tool from said fixture and said wiring, and folding and securing said sleeve to make a neat compact package.



4,987,725

METHOD OF MANUFACTURING AND FILLING CONTAINER

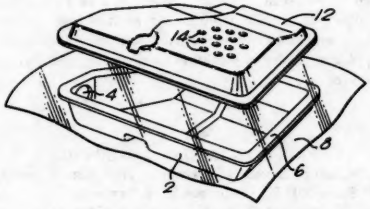
David C. Gill, Bristol, Great Britain, assignor to Nomix Manufacturing Company Limited, Staple Hill, United Kingdom

Filed Mar. 9, 1989, Ser. No. 321,574

Claims priority, application United Kingdom, Mar. 16, 1988, 8806256

Int. Cl.[5] B65B *47/02*

U.S. Cl. 53—453 **12 Claims**



1. A method of manufacturing a liquid-filled container comprising a rigid housing, the interior of which is divided into two compartments by a flexible wall, the method comprising:

(i) securing the flexible wall in a liquid-tight manner to a peripheral edge of a first rigid housing part which first rigid housing part includes an opening for the passage of liquid;

(ii) causing the flexible wall to undergo plastic deformation into a predetermined configuration which is complementary to the internal configuration of the first housing part;

(iii) securing a second rigid housing part to the first rigid housing part to enclose the flexible wall, the second rigid housing part having a vent hole for the passage of air;

(iv) displacing the flexible wall against the internal surface of the first rigid housing part;

(v) filling the container with a liquid introduced through the opening in the first rigid housing part to cause the flexible wall to be displaced away from the internal wall of the first rigid housing part, air being vented through the vent hole in the second rigid housing part.

4,987,726

BOTTLE FILLING AND SEALING APPARATUS

Lajos Pethö; Ivan Håkansson, and Lennart Månsson, all of Limoges, France, assignors to KabiVitrum AB, Stockholm, Sweden

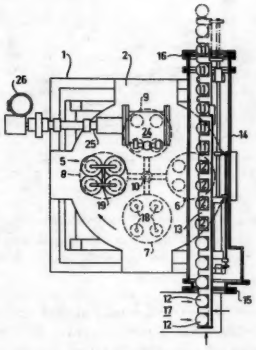
PCT No. PCT/SE88/00661, § 371 Date Jul. 6, 1989, § 102(e) Date Jul. 6, 1989, PCT Pub. No. WO89/05277, PCT Pub. Date Jun. 15, 1989

PCT Filed Dec. 2, 1988, Ser. No. 377,860

Claims priority, application Sweden, Dec. 4, 1987, 8704863

Int. Cl.[5] B67C *7/00, 3/02*

U.S. Cl. 53—510 **20 Claims**



1. An apparatus for aseptically filling bottles with a liquid preparation, comprising:

a sltation in which the sterile bottles are delivered into bottle holding devices and the bottles are purged of air with an inert gas;

a station in which the bottles are subjected to a pressure below ambient pressure and flushed or rinsed with an inert gas;

a station in which the bottles are filled with the liquid preparation;

a station in which the filled bottles are sealed;

a station in which the filled and sealed bottles are removed from the bottle holding devices; and

a transporting system which is operative to provide a successive, relative movement between the bottles in the holding devices and the stations and wherein said stations and said transporting system are enclosed by a pressure-tight casing such that the entire apparatus forms a closed system, said closed system being provided with sealing locks for the sterile infeed and outfeed of materials and products.

4,987,727

APPARATUS FOR PACKAGING CITRUS FRUIT

Stanley McClusky, and Jerry L. Boyd, both of Bakersfield, Calif., assignors to McClusky Machinery Sales & Service, Edison, Calif.

Division of Ser. No. 260,437, Oct. 22, 1989, Pat. No. 4,907,396. This application Jan. 12, 1990, Ser. No. 464,199

Int. Cl.[5] B65B *1/22, 1/24, 25/04*

U.S. Cl. 53—525 **9 Claims**

1. An apparatus for tightly packing a plurality of discrete articles in a box having outer and inner telescoped box parts and in which the inner box part extends above the outer box part with end and side flaps inwardly folded over articles in the box, the combination of:

a frame means;

a longitudinally extending table supported form the frame means;

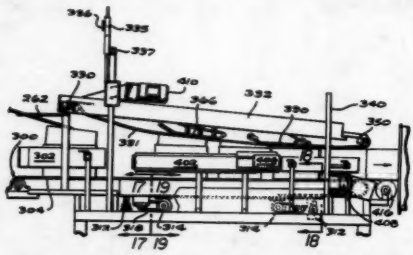
resilient means supporting opposite ends of the table from the frame;

a bottom conveyor belt having an upper lay on the upper surface of the table for receiving a box filled with articles and closed with inwardly folded end and side flaps;

means on the frame cooperable with the resiliently supported table for vibrating the table;

an upper elongated member supported from the frame in spaced relation to the upper lay of the belt on the table;

an endless upper conveyor belt supported on the upper member and having a bottom lay extending longitudinally above the upper lay of the bottom conveyor belt;



means carried by the upper elongated member for applying resilient downward pressure on the closed box to cause the inner box part to move downwardly within the outer box part;

the bottom lay of the upper conveyor belt being disposed at the exit end of the frame means in such spaced relation to the upper lay of the lower conveyor belt to cause complete closing of the inner box part within the outer box part;

whereby said vibrating table and the imposition of oppositely directed resilient pressures to the box causes the fruit to settle and become tightly arranged within the box.

4,987,728

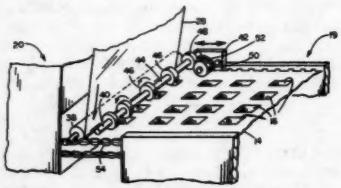
FORM, FILL, AND SEAL APPARATUS

Francis P. Ventura, Upton, Mass., assignor to T W Kutter Inc., Avon, Mass.

Continuation of Ser. No. 189,025, May 2, 1988, abandoned. This application Sep. 29, 1989, Ser. No. 414,356

Int. Cl.[5] B65B *41/16, 47/00*

U.S. Cl. 53—559 **20 Claims**



4. Form and fill packaging apparatus comprising

a thermoformer where a first plastic web is formed to provide formed receptacles for receiving articles,

a filling station where articles are placed in the formed receptacles,

a sealing station where a second web is placed over the filled receptacles and sealed to portions of the web around the receptacles,

first web drive means for advancing said first web through said thermoformer, filling station and sealing station, and

a feed mechanism that positively feeds said second web to said first web at said sealing station synchronously with the advancing of said first web,

said feed mechanism including one or more rotating drive members that have radial dimensions sized so as to cause overfeeding of said second web slightly with respect to said first web.

4,987,729

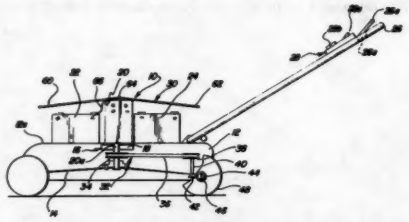
SOLAR POWERED MOWER

Anthony R. Paytas, 28177 Palomino, Warren, Mich. 48093

Filed Apr. 10, 1990, Ser. No. 506,903

Int. Cl.[5] A01D *34/10, 69/02*

U.S. Cl. 56—11.9 **4 Claims**



1. A mower for cutting grass including a protective housing for enclosing the plane of rotation of a rotary blade arranged to cut grass blades located below the protective housing and the blade being rotated by a motor on the top of the protective housing and a drive system for connecting the motor in driving relationship with the blade characterized by:

said motor comprising an electric drive motor;

means defining a cordless power supply for said electric drive motor located on the upper surface of said protective housing; said cordless power supply including a primary source of electrical power for driving said motor and a second source of electrical power for charging the primary source of electrical power as power is supplied from said primary source of electrical power to said electric drive motor for operating said rotary blade;

said secondary source of power including a pair of solar panels joined at the ends thereof at a ridge line located above said electric drive motor; each of said solar panels being inclined downward from said apex to capture sun rays from a plurality of directions during operation of the mower.

4,987,730

DEVICE FOR PICKING PULSE CROPS

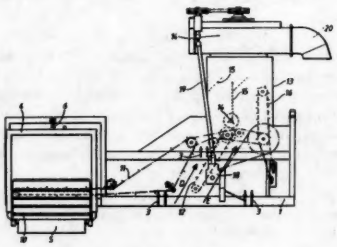
Anton M. van de Brand, At Wernhout, Netherlands, assignor to Mali-Ploeger B.V., Oudenbosch, Netherlands

Filed Aug. 9, 1989, Ser. No. 391,776

Claims priority, application Netherlands, Aug. 18, 1988, 8802048

Int. Cl.[5] A01D *45/22*

U.S. Cl. 56—16.4 **12 Claims**



1. Device for picking pulse crops comprising:

a frame provided with a coupling means for coupling the frame to the three-point hitch of a tractor;

a picking drum having teeth, said picking drum being supported by said frame and rotatably mounted about a substantially horizontal axis of rotation;

a cover partially surrounding said picking drum and fixably connected to said frame;

transport and cleaning means connected to the frame for the picked pulse crop comprising a first conveyor belt with a discharge end, said first conveyor belt transporting the crop obliquely upwards from the picking drum, a duct having a fan arranged near the upper end of the duct generating an upward air flow in the duct, said duct and fan located near the discharge end of said first conveyor belt, and a second upwardly extending conveyor belt with an upper and lower end arranged in the duct, spaced apart from the discharge end of the first conveyor belt, such that during operation, there is an upward air flow on both sides of said second conveyor belt; and

an upwardly extending endless belt with an upper and lower end, said upwardly extending endless belt provided with pins and positioned in said duct at the side of the second conveyor belt remote from said first conveyor belt, said endless belt with pins extending upwards in said duct and having a lower end at approximately the same height as the upper end of said second conveyor belt, wherein during operation of the device, said picking drum is located beside the tractor and the transport and cleaning means are located at least largely behind the tractor.

4,987,731

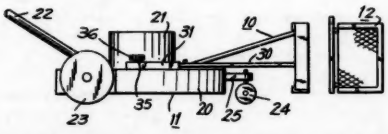
LEAF RAKE ATTACHMENT

Vito Cianciulli, and Michael A. Cianciulli, both of 124 Van Guilder Ave., New Rochelle, N.Y. 10801

Filed May 23, 1988, Ser. No. 197,545

Int. Cl.[5] A01D *34/63*

U.S. Cl. 56—17.5 **9 Claims**



1. A leaf raking attachment for a powered lawn treatment apparatus having a front, comprising a frame and a leaf pusher,

said frame comprising means for releasably holding said frame to the forwardly of a lawn treatment apparatus,

said pusher comprising a generally planar central portion and forwardly curved side portions, and means for releasably holding said pusher to said frame and forwardly thereof, said means for releasably holding said pusher comprising a pair of horizontally spaced apart vertical guide channels on said frame and a pair of vertical guide rods on said pusher adapted to be guided in said guide channels.

4,987,732

MOWING APPARATUS HAVING OPPOSITELY RECIPROCATING CUTTERS

Akio Terai, Machida; Junichi Yoshino, Tokyo; Shinroku Satsumi, Tokyo, and Mitsuru Taniguchi, Tokyo, all of Japan, assignors to Komatsu Zenoah Co., Tokyo, Japan

Continuation-in-part of Ser. No. 86,496, Aug. 17, 1988, Pat. No. 4,881,363. This application Jan. 17, 1989, Ser. No. 297,717

Claims priority, application Japan, Aug. 26, 1986, 61-198226; Jul. 6, 1987, 62-102664; Jul. 6, 1987, 62-102665

Int. Cl.[5] A01D *34/76, 34/68*

U.S. Cl. 56—255 **20 Claims**

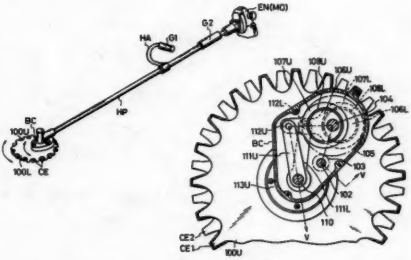
1. A mowing apparatus driven by rotational motion supplied from a motive power source, comprising:

a pair of first and second pivotal cutting wheels slidably superposed with each other, each of the wheels having a number of grass cutting edges and a central portion, the cutting wheels having two opposite sides facing away from each other; and

means arranged on one of the two opposite sides of the cutting wheels for reciprocatingly rotating said cutting wheels in opposite directions through a predetermined angle, respectively, wherein said rotating means comprises:

(a) a crank shaft rotatably driven by said motive power source,

(b) a first shaft coupled to the central portion of said first wheel,



(c) a second shaft coupled to the central portion of said second wheel and being of a hollow cylindrical configuration, said first shaft being rotatably and coaxially inserted into said second shaft, and

(d) a crank lever mechanism provided between said crank shaft and said first and second shafts for converting the rotational motion of said crank shaft into two oppositely directed reciprocatingly rotational motions of said first and second shafts to reciprocatingly rotate the first and second cutting wheels relative to each other about a common axis of said shafts through the predetermined angle.

4,987,733

CHRISTMAS TREE SHAKER

Richard L. McCanse, Oregon, Ill.; James E. McCanse, c/o McCanse Engineering Services, 949 Etnyre Terrace Rd., Oregon, Ill. 61061, and Timothy K. Fulmer, Dixon, Ill., assignors to James E. McCanse, Oregon, Ill.

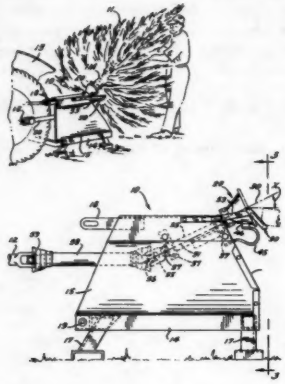
Filed Jul. 5, 1989, Ser. No. 375,811

Int. Cl.[5] A01D *46/00*

U.S. Cl. 56—340.1 **14 Claims**

14. A machine for shaking loose needles from a cut decorative tree, said machine comprising a support, a first shaft rotatably mounted on said support and having first and second ends, a holder connected to one end of said shaft for receiving the trunk of said tree and operable to shake the tree when the shaft is rotated, said holder having an axis which is inclined upwardly from horizontal at a predetermined angle, a universal joint connected to the second end of said shaft, a second shaft

connected to said universal joint and adapted to be coupled to the power take-off of a motorized vehicle, and a drive pulley



on said first shaft between the ends thereof and adapted to be connected by a drive belt to a motor.

4,987,734

RING SPINNING MACHINE

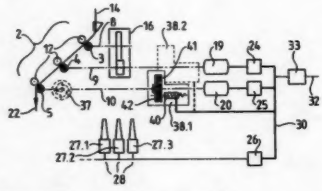
Urs Meyer, Niederglatt, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Feb. 10, 1989, Ser. No. 309,611

Claims priority, application Switzerland, Feb. 12, 1988, 00525/88

Int. Cl.[5] D01H *1/20, 1/22*

U.S. Cl. 57—100 13 Claims



1. A ring spinning machine comprising

a plurality of spinning stations;

at least one drafting device having a delivery roller and a drive shaft;

a first electric motor for driving said spinning station;

a first frequency inverter connected to said motor for feeding current to said motor;

a second electric motor for driving said shaft;

a second frequency inverter connected to said second motor for feeding current to said second motor;

at least one intermediate electrical circuit connected to said frequency inverters for supplying current thereto; and

braking means electrically coupled to said electrical circuit and being operable between a standby state and an operational state in dependence on the state of said intermediate circuit whereby in said operational state said means prevents rotation of said shaft and said delivery roller.

4,987,735

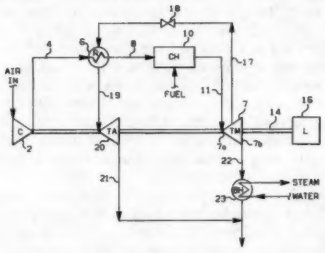
HEAT AND POWER SUPPLY SYSTEM

Bradley W. DeLong, West Columbia, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 4, 1989, Ser. No. 445,520

Int. Cl.[5] F02C *7/10*

U.S. Cl. 60—39.04 19 Claims



1. A method of supplying heat and power of the type which includes feeding compressed oxidant gas from a gas compressor to a combustion chamber in which combustion of a fuel takes place, flowing high pressure and temperature combustion products from the combustion chamber to an inlet end of a main turbine system so as to supply mechanical power to a shaft to thereby drive the shaft and so as to produce low pressure and temperature exhaust from an outlet end of the main turbine system, wherein the improvement comprises:

(a) extracting at least a portion of an intermediate pressure and temperature exhaust from a point in between the inlet and outlet ends of the main turbine system;

(b) passing the intermediate pressure and temperature exhaust through a regenerator in heat exchange relationship with the compressed oxidant gas so as to preheat the compressed oxidant gas before the oxidant gas enters the combustion chamber, thereby cooling the intermediate pressure and temperature exhaust to yield a regenerator exhaust;

(c) passing the regenerator exhaust from the regenerator to an auxiliary turbine which also drives the shaft; and

(d) flowing low pressure and temperature exhaust from the outlet end of the main turbine system to a heat exchanger so that heat is transferred from the low pressure and temperature exhaust to a fluid flowing through the heat exchanger in heat exchange relationship with the low pressure and temperature exhaust.

4,987,736

LIGHTWEIGHT GAS TURBINE ENGINE FRAME WITH FREE-FLOATING HEAT SHIELD

John J. Ciokajlo, Cincinnati, Ohio, and Daniel S. Vogt, Elsmere, Ky., assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 14, 1988, Ser. No. 284,277

Int. Cl.[5] F02C *7/20*

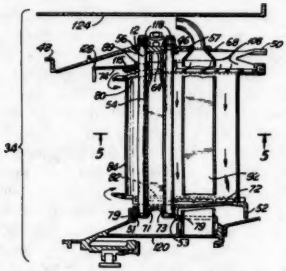
U.S. Cl. 60—39.31 15 Claims

1. A frame assembly for a turbine engine comprising:

an outer casing serving as an outer structural support member;

an inner ring serving as an inner structural support member;

a plurality of spacer struts extending between said inner ring and said outer casing; and



a compression means for maintaining said spacer struts in substantially constant compression between said inner ring and said outer casing.

4,987,737

FUEL CONTROL SYSTEM FOR GAS TURBINE AEROENGINE OVERSPEED PROTECTION

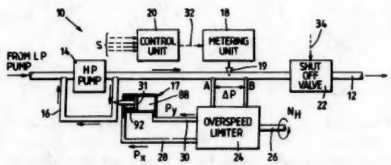
Hugh F. Cantwell, Derby, England, assignor to Rolls-Royce plc, London, England

Continuation-in-part of Ser. No. 384,901, Jul. 25, 1989, abandoned, which is a continuation of Ser. No. 111,065, Oct. 22, 1987, abandoned. This application Oct. 3, 1989, Ser. No. 418,721

Claims priority, application United Kingdom, Nov. 26, 1986, 8628296

Int. Cl.[5] F02C 9/28

U.S. Cl. 60—39.281 8 Claims



1. A fuel control system for a gas turbine aeroengine, including:

(a) pump means for supplying pressurized fuel to the engine;

(b) an electronic main fuel control unit for producing a fuel demand signal;

(c) fuel metering means for metering the pressurized fuel to the engine in accordance with the fuel demand signal a pressure drop thereby being created across the fuel metering means;

(d) fuel recirculation means for recirculating through the pump means any fuel already pumped thereby but not passing through the fuel metering means; said recirculation means including valve means for controlling the amount of fuel being so recirculated; and

(e) hydromechanical overspeed limiter means for detecting when engine rotational speed exceeds a predetermined value indicative of an overspeed and limiting fuel flow to an amount sufficient to prevent said overspeed;

wherein said hydromechanical overspeed limiter means comprises means for controlling the magnitude of said fuel metering pressure drop such that said pressure drop is continuously variable as a predetermined function of engine rotational speed throughout normal non-overspeed operation of the engine, said means for controlling the magnitude of said fuel metering pressure drop comprising means responsive to said fuel metering pressure drop and said engine speed for controlling operation of said recirculation valve means such that if the fuel metering pressure drop varies from that demanded by the engine speed in accordance with said predetermined function, the amount of fuel being recirculated is varied so as to vary the fuel flow through the fuel metering means by an amount sufficient to restore the pressure drop to the correct value with respect to the engine speed in accordance with said function.

4,987,738

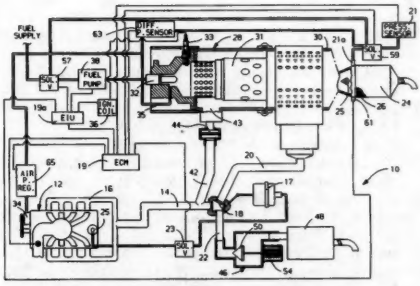
PARTICULATE TRAP SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Jose M. Lopez-Crevillen, Westland; Surendra Singh, Canton, and Arjun D. Tuteja, Novi, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 27, 1989, Ser. No. 428,387

Int. Cl.[5] F01N 3/02

U.S. Cl. 60—286 8 Claims



1. An exhaust cleaner and burner system for use with the exhaust system of an internal combustion engine comprising:

an exhaust conduit for receiving exhaust gas from the engine, having an inlet and an outlet;

a diverter valve disposed at said outlet for selectively directing exhaust flow through a first, main branch when open and a second, bypass branch when closed;

exhaust filter means having an inlet connected to said main branch and an outlet connected to the exhaust system;

burner means having an outlet mounted upstream of said filter means and operable to raise the temperature of said filter means, said burner means comprising a burner supply conduit for supplying exhaust gas to said burner, said burner supply conduit having an inlet end connected to said exhaust conduit, an outlet end connected to said burner means and a metering orifice disposed within said burner supply conduit, between said inlet end and said outlet end;

said system operable, during normal engine operation, to open said diverter valve and pass exhaust gas through said filter means, and operable, upon reaching a predetermined condition, to close said diverter valve and pass exhaust gas through said bypass branch and means for maintaining a predetermined pressure in said exhaust conduit to provide a substantially constant supply of exhaust gas to said burner means through said burner supply conduit; and

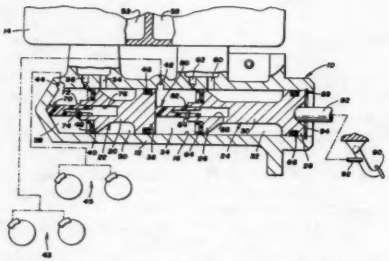
wherein said burner means is operable to raise the temperature of said exhaust gas to a level sufficient to burn particulates accumulated on said filter thereby regenerating said filter.

4,987,739

MASTER CYLINDER WITH COLLAPSIBLE PISTON LOCATOR

John R. Coleman, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 3, 1989, Ser. No. 375,151
Int. Cl.[5] B60T *11/20*
U.S. Cl. 60—562 4 Claims



1. A master cylinder for pressurizing fluid for a wheel brake system comprising:

a housing having a housing bore;

a piston reciprocably received in the housing bore and cooperating with the housing to define a chamber in communication with the wheel brake system;

a fluid reservoir having a port communicating with the chamber when the piston is established at a normal resting position within the housing bore, the port being closed off upon forward movement of the piston;

a locator member acting between the piston and the housing to establish the piston at the normal rest position enabling fluid communication through the port between the fluid reservoir and the chamber; and

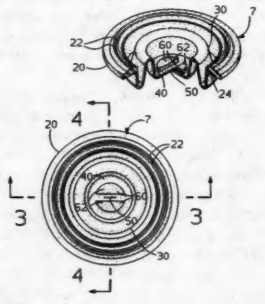
means associated with the locator member to permit the collapse of the locator member upon a first occurring forward movement of the piston forward of the normal rest position and further acting to retain the locator member in the collapsed state, whereby the piston is freed for fore and aft reciprocable movement within the housing upon subsequent movement of the piston during operation of the master cylinder.

4,987,740

ASSURED VENTING MASTER CYLINDER DIAPHRAGM APPARATUS AND METHOD

John R. Coleman, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 3, 1989, Ser. No. 331,999
Int. Cl.[5] F15B *7/00*
U.S. Cl. 60—583 9 Claims



1. A diaphragm for a vehicle brake master cylinder fluid reservoir having a vented cap with a generally planar surface, said diaphragm in combination comprising:

a sealing edge for mating with said cap and separating said reservoir fluid from said cap;

a bellows portion integrally joined with said sealing edge allowing said diaphragm to form a variable control volume above said reservoir fluid;

a sheet portion integrally joined to said bellows portion covering said reservoir fluid, said sheet portion having at least one slit normally closed preventing the passage of fluid through said diaphragm; and

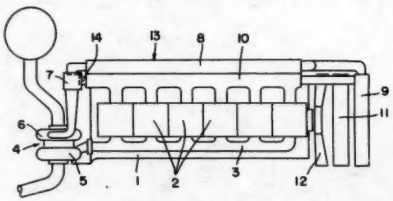
at least one slit opening means fixably joined to said sheet portion whereby expansion of the fluid pressure below said diaphragm causes said slit opening means to contact said cap planar surface and to elastically stress said sheet portion to elastically deform to open said slit preventing said slit from being sealed on said cap planar surface allowing said master cylinder reservoir to vent to the atmosphere.

4,987,741

SUPERCHARGED INTERNAL COMBUSTION ENGINE

Franz Moser, Steyr, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Sep. 1, 1989, Ser. No. 402,047
Claims priority, application Austria, Sep. 2, 1988, 2159/88
Int. Cl.[5] F02B *29/04*
U.S. Cl. 60—599 1 Claim



1. An internal combustion engine for a vehicle which travels in a forward direction, said internal combustion engine having a front end oriented toward said forward direction of travel and a rear end oriented away from said forward direction of travel, said internal combustion engine comprising,

a supercharger mounted on said rear end of said internal combustion engine for producing compressed charge air,

a charge air cooler mounted at said front end of said engine for cooling said compressed charge air,

an air receiver having a front end and a rear end aligned with said front end and said rear end of said internal combustion engine for delivering compressed charge air to cylinders of said internal combustion engine,

a charge air line extending from said supercharger through said charge air cooler to said air receiver,

bypass means for selectively supplying said charge air directly from supercharger to said air receiver on a path which bypasses said charge air cooler, said bypass means comprising a directional valve for selectively connecting said supercharger to said receiver via said charge air line extending through said charge air cooler or via said path which bypasses charge air cooler,

said directional valve being mounted on said rear end of said engine near supercharger,

said front end of said air receiver being connected to said charge air line and said rear end of said air receiver including a tubular port directly connected to said directional valve, and

a receiver housing divided into first and second parallel chambers extending from said end to said rear end of said air receiver,

said first chamber constituting said air receiver and being connected to said tubular port, and

said second chamber constituting a part of said charge air line and being connected between said directional valve and said charge air cooler.

4,987,742

PROCESS FOR THE GENERATION OF MECHANICAL ENERGY IN THE AMMONIA OXIDATION STEP OF A NITRIC ACID PRODUCTION PROCESS

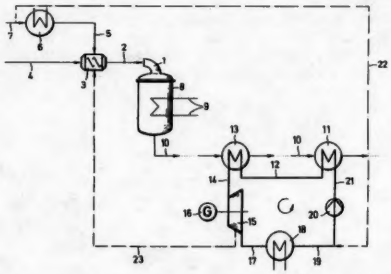
Karl W. Wiegand; Michael Thiemann, and Erich Scheibler, all of Dortmund, Fed. Rep. of Germany, assignors to Uhde GmbH, Dortmund, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 472,732

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1989, 3903571

Int. Cl.[5] F01K *25/10*

U.S. Cl. 60—648 **12 Claims**



1. A process for the generator of mechanical energy in the ammonia oxidation step of a nitric acid production process, wherein ammonia is burned to form NO_x, comprising evaporating and superheating liquid ammonia by means of the process heat in the NO_x gases in a separate loop, expanding the superheated ammonia in a turbine to generate mechanical energy and subsequently pressurizing, reevaporating and resuperheating the ammonia.

4,987,743

CRYOGENIC REFRIGERATORS

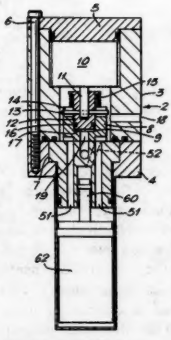
Alexander J. Lobb, Bookham, United Kingdom, assignor to The BOC Group plc, Windlesham, United Kingdom

Filed Jul. 6, 1989, Ser. No. 376,337

Claims priority, application United Kingdom, Jul. 7, 1988, 8816193

Int. Cl.[5] F25B *9/00*

U.S. Cl. 62—6 **8 Claims**



1. In a coldhead drive unit for a cryogenic refrigerator including: a casing; supply means for supplying a fluid into the casing at a working pressure; and valve means positioned within the casing for controlling the supply of the fluid to and from the coldhead and comprising, a valve plate, a valve head positioned against the valve plate and having a surface distal to the valve plate against which the working pressure acts, an effective pressure of less pressure than the working pressure acting at the interface between the valve head and valve plate so that an axial force is exerted upon the distal surface of the valve head, driving the valve head against the valve plate, and a motor having drive shaft means for rotating the valve head against the valve plate; the improvement comprising: the drive shaft means engaging the valve head in a fluid tight manner within a bore formed in the distal surface of the valve head; and the valve head having a channel linking the sealed interior of the bore and the interface between the valve head and valve plate, whereby the area of the distal surface subjected to the working pressure is reduced in an amount equal to the cross-sectional area of the bore to thereby reduce the magnitude of the axial force.

4,987,744

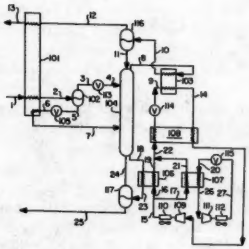
CRYOGENIC DISTILLATION WITH UNBALANCED HEAT PUMP

James R. Handley, Amherst, and Ravindra F. Pahade, Getzville, both of N.Y., assignors to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Filed Jan. 26, 1990, Ser. No. 470,715

Int. Cl.[5] F25J *3/02*

U.S. Cl. 62—24 **21 Claims**



1. A method for separating a multicomponent feed by cryogenic distillation comprising:

(A) providing feed having lighter and heavier components into a distillation column;

(B) separating the feed by cryogenic distillation in the column into a top vapor enriched in lighter components(s) and into a bottom liquid enriched in heavier component(s);

(C) heating a first heat exchange fluid by indirect heat exchange with a cooling process stream;

(D) warming the bottom liquid by indirect heat exchange with a first portion of the heated first heat exchange fluid;

(E) warming a second heat exchange fluid having a vapor pressure less than that of the first heat exchange fluid by indirect heat exchange with a second portion of the heated first heat exchange fluid;

(F) passing the cooled first and second portions resulting from steps (D) and (E) in indirect heat exchange with said process stream to carry out the heat exchange of step (C); and

(G) cooling the second heat exchange fluid and passing the resulting cooled second heat exchange fluid in indirect heat exchange with the said second portion to carry out the heat exchange of step (E).

4,987,745

CONTROLLED ENVIRONMENT TRANSPORTATION OF RESPIRING COMESTIBLES

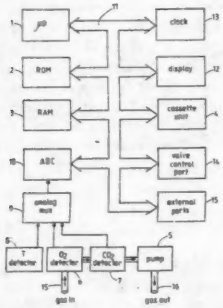
Samuel Harris, Northcote, New Zealand, assignor to Transfresh Corporation, Salinas, Calif.

Filed Jul. 25, 1989, Ser. No. 385,282

Claims priority, application New Zealand, Jul. 29, 1988, 225620

Int. Cl.[5] F24F *3/16*

U.S. Cl. 62—78 17 Claims



1. A method of transporting a quantity of at least one respiring comestible selected from plants, fruits and vegetables comprising the steps of:

loading a quantity of said at least one respiring comestible into a container;

sealing the container sufficiently to insure that less oxygen from ambient air can diffuse into the container than is required for respiration by said quantity and sufficient to insure production of carbon dioxide by said quantity as a result of the respiration greater than can diffuse from the container;

flushing the container with a gas low in oxygen concentration to reduce the oxygen concentration in the container atmosphere; and

transporting the container, including the quantity of respiring comestible, while monitoring the oxygen concentration and carbon dioxide concentration within the container and adjusting, as necessary, the oxygen level within the container by a positive infusion of ambient air into the container in response to said monitoring toward a desired value or range of values and monitoring the carbon dioxide level as necessary in response to said monitoring toward a desired value or range of values by positive infusion of ambient air into the container.

4,987,746

APPARATUS FOR TRANSFERRING WATER FROM A CONTAINER TO A REFRIGERATOR ICE MAKER

Mark J. Roberts, 6344 E. Frost, Mesa, Ariz. 85205

Filed Aug. 4, 1989, Ser. No. 389,574

Int. Cl.[5] F25C *1/00*

U.S. Cl. 62—137 5 Claims

1. Apparatus for providing water to a refrigerator, comprising, in combination:

a refrigerator;

ice maker means within the refrigerator for providing ice cubes;

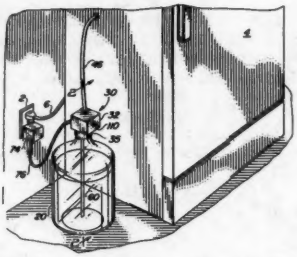
conduit means for connecting an unpressurized external source of water to the ice maker means;

first electrical means in the refrigerator for providing electrical current in the refrigerator;

timer means connected to the first electrical means for providing current for a predetermined length of time;

means for actuating the timer means in response to the demand for water from the ice maker means;

pump means connected to the conduit means for providing a flow of water from the external source to the ice maker means; and



second electrical means in the refrigerator for connecting the first electrical means to the pump means through the timer means for providing an electric current to the pump means for a predetermined length of time.

4,987,747

AIR CONDITIONING DEVICE

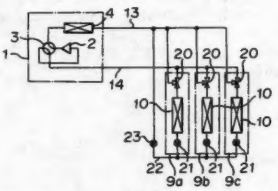
Takashi Nakamura, Wakayama; Naoki Tanaka, Amagasaki; Hitoshi Iijima, Amagasaki, and Yoshihiro Sumida, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1989, Ser. No. 417,207

Claims priority, application Japan, Oct. 17, 1988, 63-260763; Oct. 17, 1988, 63-260762; Oct. 28, 1988, 63-273771; Dec. 12, 1988, 63-313566; Jan. 24, 1989, 1-14816; Feb. 17, 1989, 1-37599

Int. Cl.[5] F25B *13/00*

U.S. Cl. 62—160 7 Claims



1. An air conditioning device comprising:

a single outdoor unit including a compressor, a four port valve, an outdoor heat exchanger, an accumulator and the like;

a plurality of indoor units connected in parallel to be outdoor unit through a first refrigerant-carrying means and a second refrigerant-carrying means;

switching valves for selectively connecting one end of the indoor units to either first refrigerant-carrying means or the second refrigerant-carrying means; and

a third refrigerant-carrying means having one end connected to the other end of the indoor units through first flow controllers, and the other end connected to the first refrigerant-carrying means through a second flow controller.

4,987,748

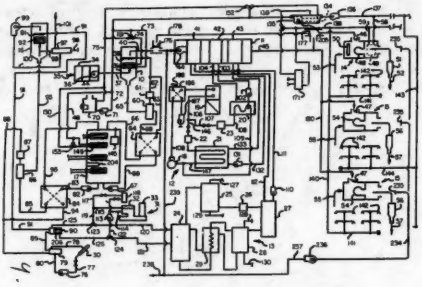
AIR CONDITIONING APPARATUS

Gershon Meckler, 1703 Channel Tower Dr., Monmouth Beach, N.J. 07750, assignor to Camp Dresser & McKee, Boston, Mass.; Gershon Meckler, Herndon, Va. and John C. Purdue, Toledo, Ohio

Continuation of Ser. No. 49,260, May 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 861,058, May 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 841,454, Mar. 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 732,561, May 9, 1985, abandoned, which is a continuation-in-part of Ser. No. 719,357, Apr. 3, 1985, abandoned. This application Feb. 2, 1989, Ser. No. 304,938

Int. Cl.[5] F25D *17/08*

U.S. Cl. 62—176.1 **89 Claims**



1. Apparatus for air conditioning a plurality of spaces, said apparatus comprising a plurality of air outlets, means for dehumidifying outside air or a mixture of outside air and return air, cooling means including a plurality of coils and means for transferring heat from each of said coils to a heat sink, each of said coils being operable to serve one of the spaces by lowering the temperature thereof when heat is transferred therefrom to the means for circulating dehumidified air to said air outlets, at a rate per unit of area in the spaces served by said air outlets which varies between a predetermined minimum rate greater than zero and a maximum rate, the maximum rate being substantially less than that which would be required maintain the design temperature in each of the spaces at the maximum design cooling load with air at a dry bulb temperature of 55° F., means operable to control its moisture content and temperature so that the dehumidified air is incapable, at the rate at which it is required for humidity control, of maintaining the desired space temperature at the maximum design cooling load, a sensor for measuring the absolute or relative humidity of at least one of the spaces served by said air outlets, means responsive to said sensor, and operable to control the rate at which dehumidified air is delivered by each of said air outlets to the space it serves to one not less than the predetermined minimum rate and higher than that minimum when required to maintain the moisture content of the space served within control limits, and means operable to control the rate at which dehumidified air is delivered to said air outlets so that dehumidified air is available at the rate required from time to time by said air outlets.

4,987,749

THERMISTOR PROBE FOR EXPOSED SENSING ELEMENT FOR DIRECT IMMERSION IN REFRIGERANT FLOWS

Terence D. Baier, La Crosse, Wis., assignor to American Standard Inc., New York, N.Y.

Filed Mar. 29, 1990, Ser. No. 501,213

Int. Cl.[5] G01K *1/08*

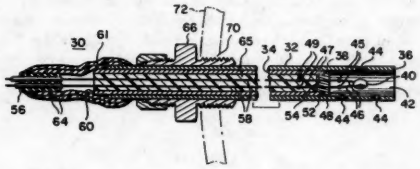
U.S. Cl. 62—222 **26 Claims**

1. A fast response temperature probe for use in the refrigerant line of a refrigeration system comprising:

a temperature sensitive element;

means for operably connecting the temperature sensitive element to a control line of a refrigeration system controller;

an inner housing supporting the temperature sensitive element at a first end and enclosing the operable connection means; and



an outer housing surrounding the temperature sensitive element and the first end of the inner housing, the outer housing including at least one aperture located in proximity to the temperature sensitive element

wherein the temperature sensitive element is mounted on a header, and the header is mounted on the first end of the inner housing.

4,987,750

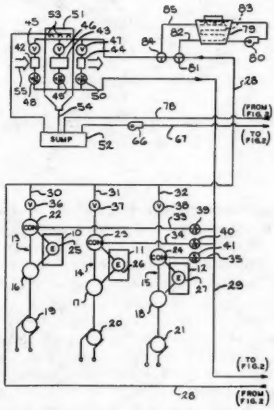
AIR CONDITIONING APPARATUS

Gershon Meckler, 725 Campbell Way, Herndon, Va. 22070

Continuation-in-part of Ser. No. 335,910, Apr. 10, 1989, abandoned, which is a continuation-in-part of Ser. No. 151,856, Feb. 3, 1988, Pat. No. 4,819,444, which is a continuation-in-part of Ser. No. 883,013, Jul. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 732,561, May 9, 1985, abandoned. This application Jan. 22, 1990, Ser. No. 473,149

Int. Cl.[5] P25B *27/02*

U.S. Cl. 62—238.6 **3 Claims**



1. Apparatus for conditioning the air of a closed space and for removing heat from a refrigerated display case therein, said apparatus comprising, in combination, first refrigeration apparatus which comprises a heat rejecting section, a compressor, and a heat absorbing section operatively associated to transfer heat from the refrigerated case, second refrigeration apparatus which includes a heat absorbing section, a heat rejecting section and a compressor, a chemical dehumidifier which uses a desiccant, a regenerator for said dehumidifier, means for converting a fuel into heat and shaft work, means operatively connecting said last named means in driving relationship with an electric generator, means operably connecting said generator to supply electricity to a building served by said apparatus,

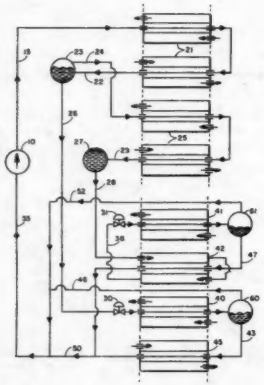
means for transferring heat from said means for converting a fuel into heat and shaft work to said regenerator to enable regeneration of the desiccant of said dehumidifier, means for transferring heat from the condenser of said first refrigeration apparatus to the heat absorbing section of said second refrigeration apparatus, and means for causing air to flow in dehumidifying relationship with said humidifier and then into said space, said apparatus being operable to maintain the temperature of the case below that of the closed space and to deliver dehumidified air to the space to maintain a humidity ratio in the closed space below about 50 grains of moisture per pound of dry air.

4,987,751

PROCESS TO EXPAND THE TEMPERATURE GLIDE OF A NON-AZEOTROPIC WORKING FLUID MIXTURE IN A VAPOR COMPRESSION CYCLE

Joseph M. Lewen, 4204 Grove Ave., Brookfield, Ill. 60513

Filed Apr. 9, 1990, Ser. No. 506,297
Int. Cl.[5] F25B *1/00*
U.S. Cl. 62—502 **4 Claims**



1. An evaporator-separator system for use in a vapor compression refrigeration device that has compressor means, condenser means, expansion means and that uses a non-azeotropic refrigerant composed of a mixture of two or more refrigerants of different boiling temperatures, said evaporator-separator system comprising:

one or a plurality of sections, each section having an evaporator with an inlet and an outlet in which said non-azeotropic refrigerant is not fully evaporated, a separator for separating liquid mixture and vapor mixture at low pressure, with an inlet, an outlet for vapor mixture and an outlet for liquid mixture, a first piping means connecting the outlet of said evaporator of a section with said inlet of the separator of a section, a second piping means connecting said vapor mixture outlet of the separator of a section with said compressor means, and a third piping means connecting said liquid mixture outlet of the separator of a section with said inlet of the evaporator of another section; and

A final section having an evaporator with an inlet and an outlet in which the non-azeotropic refrigerant is fully evaporated, a piping means connecting said outlet of the final section evaporator with said compressor means, said inlet of the final section evaporator being connected by said third piping means of another section with said liquid mixture outlet of the separator of said other section.

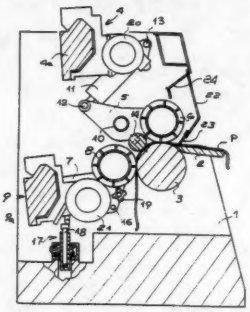
4,987,752

HIDE SKIVING MACHINE

Franco Bertucci, Ramiseto; Romano Burani, Carpi, and Raffaele Facchi, Modena, all of Italy, assignors to S.P.A. Luigi Rizzi & C., Modena, Italy

Filed Nov. 18, 1988, Ser. No. 272,859
Claims priority, application Italy, Nov. 24, 1987, 22748 A/87
Int. Cl.[5] C14B *1/22, 17/14*
U.S. Cl. 69—9.5 **21 Claims**

1. Hide skiving machine adapted to skive a hide in a single pass comprising: a supporting frame with sides, a rotatable support cylinder supported by said sides of said supporting frame, an upper oscillating frame having a first blade cylinder and a lower oscillating frame having a second blade cylinder, said oscillating frames being independently movable between at least one raised position, in which said blade cylinders are spaced away from said support cylinder, and a lowered-work position, in which said blade cylinders are at a short distance from said support cylinder and are in skiving contact with said hide arranged on said support cylinder, actuator means to position said oscillating frames and thereby related said blade



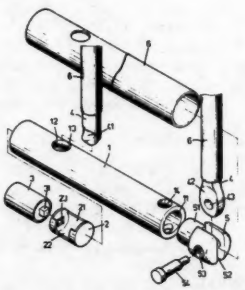
cylinders in said lowered-work position and in said at least one raised position, wherein said actuator means comprise a positioning element adapted to lift and lower related said oscillating frame, and an adjusting element connected in series to said actuator means and adapted to provide a precision adjustment of said work position of related said blade cylinder.

4,987,753

PADLOCK

Wen T. Kuo, No. 16, Lane 459, Sec. 1, An Ho Road., Tainan, Taiwan

Filed Dec. 6, 1989, Ser. No. 446,697
Int. Cl.[5] E05B *9/04*
U.S. Cl. 70—39 **1 Claim**



1. An improved padlock comprising:

a lock body having a through opening defining a through bore, said lock body having opposite ends for removable insert of a lock mechanism within one end and a pivot

member fixedly insertable within the other end, said lock body including an inclined wall through opening;

a U-shaped shackle member having opposing legs of equal length, one of said legs being insertable within said inclined wall opening, and said other leg being rotatably mounted on said pivot member external said lock body;

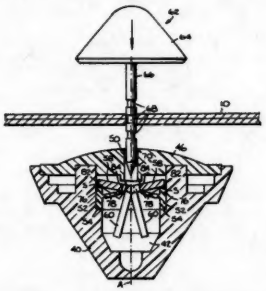
an engaging member insertable within said lock body through opening and rotatable with respect to said lock body, said engaging member being rotatable into capturing relation with one of said legs of said shackle member having a notch formed therein, said engaging member having a square hole for passing therethrough of a lug member mounted on said locking mechanism, said other leg of said shackle being elliptically contoured for contacting a wall of said pivot member when said shackle is opened through a predetermined angle.

4,987,754

MAGNETICALLY RELEASABLE TARGET LOCK

Arthur J. Minasy, Woodbury, and Christopher Olszewski, Roslyn Heights, both of N.Y., assignors to Knogo Corporation, Hauppauge, N.Y.

Filed Jan. 12, 1990, Ser. No. 465,048
Int. Cl.[5] E05B *65/00*
U.S. Cl. 70—57.1 **18 Claims**



1. A magnetically releasable pin lock comprising; a housing formed with an internal cavity and a pin access hole extending along a longitudinal axis into said cavity from outside said housing; a rigid catch element mounted within said cavity for limited pivotal movement about a pivot axis perpendicular to and displaced from said longitudinal axis, said catch element including a front edge which moves toward and away from said longitudinal axis as said catch element pivots about said pivot axis; and an elongated magnetizable actuation element within said cavity and extending from a location on said catch element displaced toward said longitudinal axis from said pivot axis, said actuation element extending generally along said longitudinal axis in a direction away from said access hole.

4,987,755

HIGH SECURITY LOCK ASSEMBLY

Gale A. Groh, Mitchell, and George J. Sallade, Springville, both of Ind., assignors to The United States of America, as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 4, 1981, Ser. No. 240,432
Int. Cl.[3] E05B *65/06*
U.S. Cl. 70—134 **6 Claims**

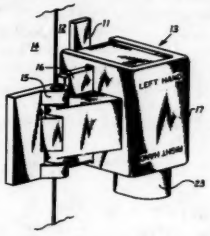
1. A high security locking system for securing together first and second members comprising,

lock shackle pins,

means for attaching said lock shackle pins to a first member,

a cover assembly attached to a second member and having an end opening sufficiently large to allow passage of said shackle pins and having a bottom opening larger than said end opening, and

a lock engageable with said shackle pins having a size sufficiently small to pass through said bottom opening but too large to pass through said end opening whereby said lock



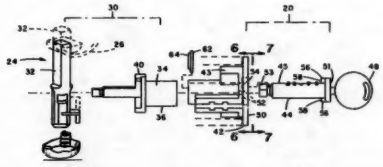
and said shackle pins are enclosed by said cover assembly when said lock is engaged with said shackle pins and said first and second members are secured together.

4,987,756

VEHICLE SWITCH WITH ROTATION PREVENTING MEANS

Ricky L. Fancher, Greeneville, Tenn., assignor to Hurd Lock and Manufacturing Co., Inc., Greeneville, Tenn.

Filed Jan. 3, 1989, Ser. No. 292,753
Int. Cl.[5] B60R *25/02*
U.S. Cl. 70—186 **19 Claims**



1. A key-manipulatable switch for a vehicle comprising:

a housing;

a cylinder mounted within the housing for rotation relative thereto between a first rotational position and a second rotational position and for axial movement relative thereto between a first axial position and a second axial position when the cylinder is in said first rotational position; and

a stop member mounted within the cylinder for movement relative thereto between an extended position and a retracted position and being biased from the retracted position to the extended position so that when the cylinder is positioned in said first axial position; said stop member is in its extended position;

said housing having a body encircling the cylinder and including a projecting lug projecting radially inwardly toward the cylinder and disposed in such a relationship with respect to said stop member when said cylinder is positioned in said first rotational position so that when said cylinder is positioned in said first axial position and subsequently urged toward said second rotational position said stop member abuttingly engages said lug so as to prevent the rotational movement of said cylinder to said second rotational position and so that when said cylinder is positioned in said second axial position and subsequently urged toward said second rotational position, said stop member passes to one side of so as to clear said lug and thereby permit the rotational movement of said cylinder from said first rotational position to said second rotational position so that said cylinder is rotatably movable from the first rotational position to the second rotational position when the cylinder is positioned in the first axial position to the second axial position with no rotational movement of the cylinder relative to the housing and then rotatably urging the cylinder toward the second rotational position,

said stop member being cooperable with said lug so as to

permit substantially unrestricted movement of said cylinder from said second rotational position to said first rotational position when said cylinder is positioned in said first axial position, said stop member adapted to move from its extended position to its retracted position in opposition to the force of the aforesaid stop member bias as said cylinder is rotated from said second rotational position to said first rotational position so that as the cylinder is rotated from said second rotational position to said first rotational position, said stop member passes radially inwardly of said lug.

4,987,757

LOCK FOR CAR DOORS, IN PARTICULAR FOR TRUNK

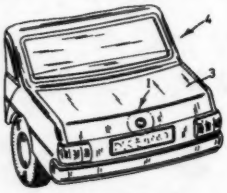
Emil Feder, Hannoversche Str. 12, D-3501, Niestetal, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 360,885

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729555

Int. Cl.[5] E05B *65/12*

U.S. Cl. 70—240 **6 Claims**



1. In a vehicle, a frame member; a door member movable with reference to said frame member between open and closed positions; and a lock actuatable to hold said door member in closed position, said lock having a part movable between a first position of concealment in at least one of said members in which said part is shielded against contamination and an exposed second position in which said part is accessible from the outside of the vehicle and can be used as a handle to facilitate movements of said door member between open and closed positions.

4,987,758

BURGLARPROOF LOCK

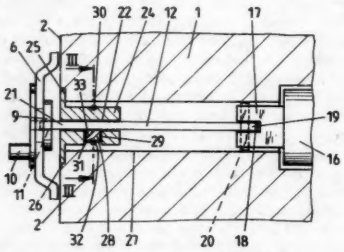
Armin Eisermann, Velbert, Fed. Rep. of Germany, assignor to Schulte-Schlagbaum Aktiengesellschaft, Velbert, Fed. Rep. of Germany

Filed Sep. 25, 1989, Ser. No. 412,278

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1988, 3833403

Int. Cl.[5] E05B *17/04*

U.S. Cl. 70—379 R **6 Claims**



1. A lock assembly for a door or similar type of panel, wherein the lock assembly comprises

a lock disposed on the inner side of the door to be actuated from the outer side of the door;

a closing means on the outer side of the door;

a coupling rod extending through the door for connecting the lock to the closing means;

a bushing having a channel, the bushing being located between said closing means and said lock, the coupling rod passing through the channel;

a channel closure jaw positioned at a side of said channel; and

wherein said closure jaw is spring loaded against said coupling rod to close said channel in the absence of said coupling rod; and

said bushing includes a slot which is transverse to and opening into said channel, the channel closure jaw being formed as a wall segment within the transverse slot of said bushing.

4,987,759

MACHINE FOR MANUFACTURING HELICALLY-SEAMING TUBING

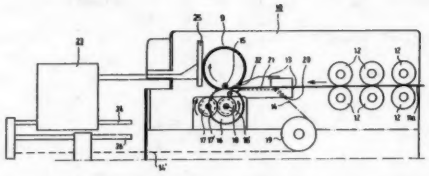
Kalervo Malkki, Helsinki, Finland, assignor to Tuotekolmio Oy, Finland

Filed Feb. 13, 1990, Ser. No. 479,400

Claims priority, application Finland, Feb. 17, 1989, 890784

Int. Cl.[5] B21C *37/12*

U.S. Cl. 72—49 **7 Claims**



1. A machine for manufacturing helically-seamed tubing from a strip-like profiled blank, said machine comprising;

a loop for positively guiding said strip-like profiled blank into a helical shape, said loop comprising a chain-type traction member and inside which loop said strip-like profiled blank is caused to be positively fed whereupon it assumes the shape of a tube;

a rocker;

an articulated arm connecting said rocker and one end of said traction member;

said rocker comprising at least one adjusting member for guiding a rear edge of said helically shaped strip-like profiled blank to a point of seaming;

a gearbox connected to another end of said traction member;

a slide bar on which said gearbox is mounted for movement relative thereto;

a gear member connected within said gearbox such that movement of said gearbox along said slide bar causes said gear member to pull said traction member such that said traction member can be tightened to cause the diameter of said loop to lessen such that a narrowing portion can be produced in said tube;

a support connected to said gearbox for positioning said tube for seaming; and

two seaming rolls for seaming together adjacent edges of said tube.

4,987,760

LEAF-SPRING BENDER

Helmut Schulte, Ennepetal-Voerde, Fed. Rep. of Germany, assignor to Luhn & Pulvermacher GmbH & Co., Haten, Fed. Rep. of Germany

Filed Jan. 12, 1990, Ser. No. 464,426

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1989, 3901751

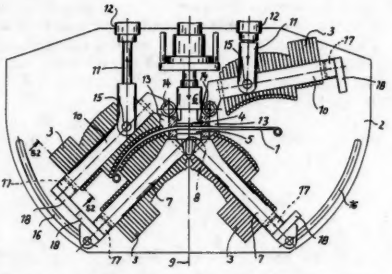
Int. Cl.[5] B21D *37/06*

U.S. Cl. 72—306 **7 Claims**

1. An apparatus for bending a leaf spring from a generally straight into an arcuate shape, the apparatus comprising:

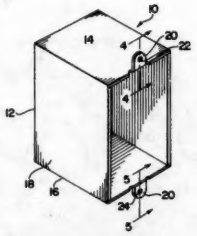
a frame;

a lower jaw assembly on the frame and including
a fixed central jaw having a flat upper face, and
a pair of normally curved side jaws flanking the central jaw, each formed by a group of shape-defining fingers, and pivotal about an axis generally centrally between them between a position defining an angle of about 180° and a position defining an angle substantially smaller than 180°;
an upper jaw assembly on the frame and including
a vertically displaceable central jaw having a generally flat lower face above the lower central jaw,
a pair of normally curved side jaws flanking the upper central jaw above the lower side jaws and each formed with a respective guide slot,
a respective group of shape-defining fingers in each of the slots,



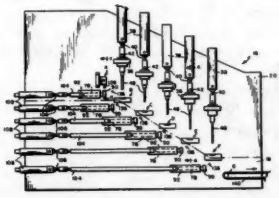
means for clamping the fingers in the respective slot against movement therein, and
means supporting the upper side jaws for angular movement about generally parallel axes adjacent the upper central jaw, whereby the upper side jaws can be positioned generally parallel to the lower side jaws; and
means for vertically displacing the upper central jaw down on the frame toward the lower central jaw and thereby clamping a middle of a generally straight workpiece blank between the faces; and
means for displacing the upper side jaws on the frame toward the lower jaws and thereby bending down ends of the workpiece clamped between the central jaws.

4,987,761
METHOD OF FORMING A DEVICE INCLUDING AN INTEGRALLY FORMED NUT
August J. Saccoccio, 996B Pontiac Ave., Cranston, R.I. 02920
Filed Jul. 11, 1988, Ser. No. 217,538
Int. Cl.[5] B21D *28/00, 53/20;* **F16B** *37/16*
U.S. Cl. 72—335 **2 Claims**



1. The method of forming a device such as a box having in turn a nut integrally formed therein from a blank of workable sheet material comprising the steps of positioning said blank in a work holder of tooling having progressive work stations, forming a circular smooth bore opening through said blank, and thereafter inwardly reforming edge portions of said blank adjacent said opening into said opening so as to form a multiple number of discontinuous flats chordally extending across the inner periphery of said opening and entirely within the thickness of said opening, said flats meet to form a generally V-shaped running edge forming a tooth for engagement with the threads of a screw adapted to be received in said opening with the edge of said tooth extending up to but not exceeding one complete revolution within said opening and thereafter removing said blank from said tooling, and further including the steps of die cutting and scoring said blank and thereafter bending portions of said blank to assemble said device wherein said nut is an integral part thereof.

4,987,762
INDIVIDUALLY VARIABLE MULTI-STATION DRAWING APPARATUS
Richard Cash, Sr., Attleboro, Mass., assignor to Sterns Metals Inc., R.I.
Filed Dec. 8, 1989, Ser. No. 447,842
Int. Cl.[5] B21D *22/28*
U.S. Cl. 72—349 **12 Claims**



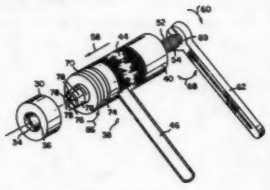
1. An individually variable multi-station drawing apparatus for progressively drawing a shallow cup-shaped workpiece into an elongated cylindrical tube, said apparatus comprising:
(a) a succession of drawing stations arranged in a multi-level configuration, each station other than the first of said stations being vertically offset from and at a level lower than that of a preceding station, each station including:
(i) a circular die carried on a base plate having guide posts extending vertically therefrom;
(ii) a cylindrical plunger aligned axially with said die, said plunger depending from a cross beam mounted on said guide posts for vertical reciprocal movement towards and away from said base plate; and
(iii) a fluid-actuated ram for vertically reciprocating said cross beam to operate said plunger between a retracted position spaced above said die to accommodate receipt of a workpiece at a pre-draw location interposed between said plunger and said die, and an extended position protruding through said die to force a workpiece from said pre-draw location through said die to a drawn location beneath said die;
the dies and plungers of successive stations being dimensioned to progressively draw said workpiece into said tube;
(b) loading means for positioning successive cup-shaped workpieces at a receiving location in advance of the first of said drawing stations; and
(c) transfer means for laterally shifting workpieces from said receiving location to the pre-draw location of the first station, from the drawn location of each station to the pre-draw location of the next successive station, and from the drawn location of the last of said stations to a delivery location.

4,987,763

TOOL IN KIT FORM FOR DEFORMING METAL

Anthony S. Kistner, Greensburg; Wayne M. Staats, Pittsburgh, and Norman O. Staats, Irwin, all of Pa., assignors to O. M. S., Inc., Irwin, Pa.

Filed Feb. 28, 1990, Ser. No. 486,320
Int. Cl.[5] B21D *39/20*
U.S. Cl. 72—353.4 20 Claims



1. Tool in kit form for deforming metal comprising:

removable mold means for being positioned in contact with corrugated conduit, said mold means comprising a generally cylindrical and generally annular ring means;

hand-held and hand operable forming means for being positioned in contact with the end of the conduit, said forming means comprising expandable member means for applying a generally radially outward force on the interior of the end of the conduit when said expandable member means is expanded;

said mold means and said forming means being configured to cooperatively form an end structure of the conduit; and

said mold means comprising a unitary structure providing a continuous inner periphery.

4,987,764

METHOD FOR MANUFACTURING A SEAT POST OF A BICYCLE

Chin-Pei Chen, No. 198, Feng Chou Rd., Shen Kang Hsiang, Taichung Hsien, Taiwan

Filed Dec. 18, 1989, Ser. No. 451,921
Int. Cl.[5] B21D *53/86*
U.S. Cl. 72—367 1 Claim

1. A method for manufacturing a seat post of bicycle, said seat post being substantially a cylindrical tube with a seat support integrally formed thereon, said method comprising:

tapering a free end of said cylindrical tube so as to form a tapered end, said cylindrical tube being clamped by a clamping mechanism and being arranged such that said free end thereof extends beyond said clamping mechanism, a first mold being disposed beside said clamping mechanism and relatively movable toward said clamping mechanism, a tapered hole which is radially tapered inwards being formed in said first mold and opening toward said clamping, and said tapered end being formed on said free end of said cylindrical tube when said fist mold moves toward said clamping mechanism;

bending said tapered end of said cylindrical tube so as to form a bent end, said tapered end being placed between a first lower mold and a first upper mold each having a first mold cavity formed therein, said bent end being formed when one of said first lower mold and said first upper mold moves toward the other, and said bent end being formed with a curvature;

forming said bent end of said cylindrical tube so as to form said seat support, said bent end being placed between a second lower mold and a second upper mold each having a second mold cavity formed therein, said seat support being formed when one of said second lower mold and said second upper mold moves toward the other; and

drilling a hole in said seat support;

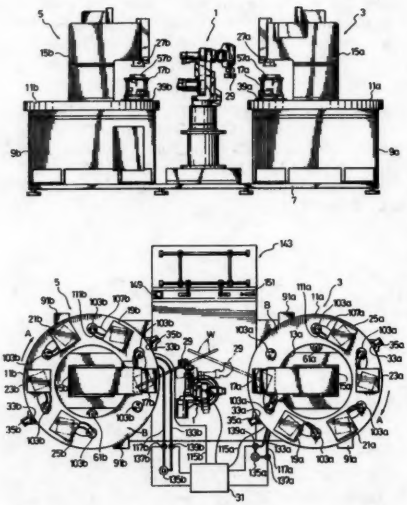
whereby said seat support and said seat post are integrally formed together, and said seat support has a high strength.

4,987,765

METHOD AND APPARATUS FOR MULTI-STEP WORKPIECE MANUFACTURING

Tatsuo Nishimura; Makoto Chikama, and Koichi Ogiwara, all of Yokohama, Japan, assignors to Hashimoto Forming Industry Co., Ltd., Kanagawa, Japan

Filed Nov. 21, 1989, Ser. No. 440,030
Claims priority, application Japan, Nov. 25, 1988, 63-296234
Int. Cl.[5] B21D *43/00*
U.S. Cl. 72—405 10 Claims



6. A method of manufacturing a workpiece, comprising the steps of:

(a) providing at least two manufacturing means for applying manufacturing steps to the workpiece, each one of which including:

a press machine having a ram;

a table means for carrying a plurality of manufacturing press dies corresponding to different manufacturing steps to be applied to the workpiece, the table means being capable of moving the manufacturing press dies intermittently under the ram of the press machine such that any one of the manufacturing press dies can be placed under the ram of the press machine selectively;

(b) providing means for transferring the workpiece among the manufacturing means, capable of transferring the workpiece in and out of one manufacturing press die of one manufacturing means placed under the ram of the press machine;

(c) controlling the manufacturing means and the transferring means such that while one manufacturing step is being applied by one manufacturing means and then the workpiece is being transferred by the transferring means from that one manufacturing means to another manufacturing means for applying a next manufacturing step to the workpiece, the table means of the another manufacturing means is intermittently moved to prepare for the next manufacturing step by placing an appropriate one of the manufacturing press dies under the ram of the press machine of the another manufacturing means.

4,987,766

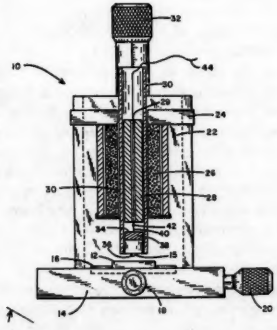
METHOD FOR DETERMINING THE MICRO IMPACT ENERGY CAPACITY OF THE SURFACE OF A DISK DRIVE HEAD AND A THIN FILM DISK

Amarjit S. Brar, Edina, and Jagdish P. Sharma, Bloomington, both of Minn., assignors to Magnetic Peripherals Inc., Minnetonka, Minn.

Continuation-in-part of Ser. No. 212,458, Jun. 28, 1988, abandoned, which is a division of Ser. No. 96,185, Sep. 11, 1987, Pat. No. 4,776,202. This application Jun. 30, 1989, Ser. No. 374,197

Int. Cl.[5] G01N *3/30, 3/48*

U.S. Cl. 73—12 **3 Claims**



1. A method for testing the micro impact energy capacity of the surface of a sample comprising the steps of:

supporting an indentor at a selected height above the sample;

recording the mass of the indentor;

dropping the indentor onto the surface of the sample;

measuring and recording the area of the indentation;

determining the stress from the recorded mass, the acceleration due to gravity, and the area of the indentation;

determining the strain from the measurement of the indentation;

repositioning the sample;

changing the mass of the indentor;

repeating the above steps to produce a plurality of points for a stress-strain curve;

plotting stress verses strain to produce a stress-strain curve; and

determining the micro-impact energy capacity of the surface of the sample by calculating the area beneath the stress-strain curve produced.

4,987,767

EXPOSIVE DETECTION SCREENING SYSTEM

Colin D. Corrigan; Lawrence V. Haley, and Douglas P. Menagh, all of Nepean, Canada, assignors to Research Corporation Technologies, Inc., Tucson, Ariz.

Continuation-in-part of Ser. No. 364,663, Jun. 9, 1989, abandoned. This application Dec. 8, 1989, Ser. No. 447,724

Int. Cl.[5] G01N *30/00*

U.S. Cl. 73—23.36 **73 Claims**

1. A walk-through explosive detection screening system for the detection of concealed explosives, chemical agents and other controlled substances such as drugs or narcotics by detecting their vapor or particulate emissions, said system comprising:

(a) a walk-through sampling chamber means for gathering a sample of the environment surrounding a person or object passing through said sampling chamber means by sweeping the vapor or particulate emissions from said person or object, said sampling chamber means having an entrance and exit portal defined by at least two walls, and a convergent ceiling which opens into an air plenum;

(b) a pair of inwardly directed and vertically oriented air flow guide means on either side of each of said entrance and exit portals, said air flow guide means directing air towards a center region of said sampling chamber means with a predetermined velocity, the combination of said air flows from said pair of inwardly directed and vertically oriented air flow guide means creating a dynamic high pressure zone in said sampling chamber means;

(c) means for recirculating air between said pair of inwardly directed and vertically oriented guide means and said air plenum, the recirculating air creating a dynamic low pressure zone in the region of said convergent ceiling, said dynamic high and low pressure zones creating a region within said sampling chamber means that does not allow an appreciable amount of air in or out of said entrance and exit portals;

(d) a sample collection means to collect a sample volume of air that is swept off the individual or object passing through said sampling chamber means, said sample collection means including means for collecting a volume of air from a sampling port mounted in the plenum and centered in said convergent ceiling;

(e) means for concentrating said vapor or particulate emissions collected by said sample collection means, said means for concentrating having a first means for adsorption and a second means for desorption of said concentrated vapor or particulates;

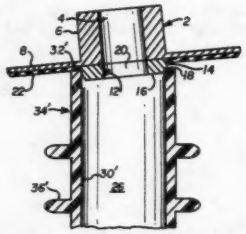
(f) detecting means responsive to said vapor or particulate emissions desorbed from said second means for desorption to generate a first signal and an alarm.

4,987,768

METHOD AND APPARATUS FOR INSPECTION OF CONTAINERS

Henry M. Dimmick, Butler; Paul Schneider, Valencia, and Richard Spryn, Fenelton, all of Pa., assignors to AGR International, Inc., Butler, Pa.

Filed Oct. 24, 1989, Ser. No. 426,426
Int. Cl.[5] G01M *3/32*
U.S. Cl. 73—37.5 3 Claims



1. The method of inspecting container necks for the desired configuration including,

providing an inspection member having an upper body portion with a longitudinal bore therethrough, a downwardly projecting lower body portion having a passageway in sealed communication with said bore with the lower body portion having an outer surface corresponding generally to the desired shape and minimum permissible diameter of the inner container neck and sealing means for sealing said upper body portion and said lower body portion to a container neck of the desired shape,

attempting to insert said lower body portion into said container neck by establishing relative axial closing movement between said inspection member and said container neck,

determining whether said container neck and lower body portion are sealingly connected thereby indicating the presence of a container of the desired shape,

providing said lower body portion with an annular generally cylindrical lateral surface which determines in a downwardly and inwardly tapered portion,

determining whether said container neck is of desired cylindrical shape, and

employing said method to check for undesired ovality of said container neck.

4,987,769

ULTRASONIC LEAK DETECTION

David J. H. Peacock, 200-204 Bye Pass Road, Chillwell, Nottingham, United Kingdom NG9 , and Michael D. Dorsett, Nottingham, United Kingdom, assignors to David John Howard Peacock, Chillwell, United Kingdom

Filed Nov. 6, 1989, Ser. No. 431,832
Int. Cl.[5] G01M *3/24*
U.S. Cl. 73—49.7 14 Claims

1. An ultrasonic leak detection apparatus, comprising:

(a) a source body;

(b) an ultrasonic source housed in said source body;

(c) said source body being adapted for attachment to a container of a kind which includes at least one sealable aperture;

(d) said source body including means for maintaining integrity of said container;

(e) a portable detector body;

(f) an ultrasonic detector mounted in said detector body;

(g) means for adapting said detector body for directing ultrasonic signals from a visually identifiable location to said ultrasonic detector, whereby location of any breach of integrity of said container may be carried out by injecting ultrasonic signals from said source to said container; and

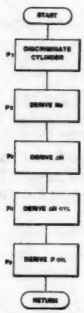
(h) at least one extension part for connecting to said source body, said part comprising an elongate body having a demountable connector at one end and a matching socket at the opposed end to facilitate extending the reach of said apparatus.

4,987,770

COMBUSTIONING CONDITION MONITORING SYSTEM FOR INTERNAL COMBUSTION ENGINE

Yasutoshi Nanyoshi, Hyogo, and Toshio Matsumura, Kanagawa, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jul. 27, 1989, Ser. No. 385,868
Claims priority, application Japan, Jul. 27, 1988, 63-189320
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—115 10 Claims



1. A system for monitoring a combustioning condition of an internal combustion engine having a plurality of engine cylinders, comprising:

first means for monitoring engine operational cycle positions from time to time and for producing an engine cycle position indicative signal;

second means for receiving said engine cycle position indicative signal and for detecting the engine at a predetermined engine cycle position for producing a timing signal;

third means, responsive to said timing signal, for deriving an engine revolution speed indicative data, and, based thereon, for deriving a combustioning condition dependent coefficient for each engine cylinder in a combustioning cycle, which combustioning condition dependent coefficient represents a degree of influence of the combustioning condition of the engine cylinder on the engine revolution speed;

fourth means for deriving an engine revolution speed variation of each cylinder on the basis of said engine revolution indicative data; and

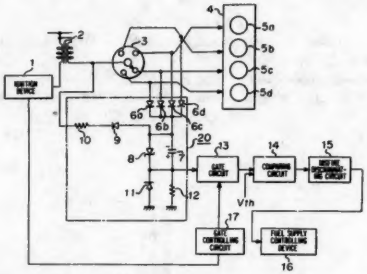
fifth means for deriving a data representative of an internal pressure of each engine cylinder on the basis of said engine revolution speed indicative data and said combustion condition dependent coefficients derived for all engine cylinders, and for detecting the combustioning condition in said cylinder on the basis of said internal pressure.

4,987,771

MISFIRE DETECTION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Toshio Iwata, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,360
Claims priority, application Japan, Oct. 13, 1988, 63-255832
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—117.3 8 Claims



1. A misfire detection device for an internal combustion engine having an ignition coil and a plurality of cylinders, each of said cylinders having a respective ignition plug, said misfire detection device comprising:

an ionic current detection means to detect an ionic current which is caused by combustion and occurs at the respective ignition plug of at least one of said plurality of cylinders and to generate an output signal which represents said detected ionic current, said ionic current detection means comprising a capacitor to be charged by a current flowing through a secondary winding of said ignition coil, wherein said ionic current caused by combustion flows through said capacitor and a resistor of said ionic current detection means;

a gate means to mask said output signal generated from said ionic current detection means only during an ignition sparking time period;

a comparing means to compare said masked output signal passed through said gate means with a predetermined level and to provide a comparison output signal;

a misfire detection means to detect the presence or the absence of a misfire and a misfired cylinder based on the comparison output signal; and

fuel supply controlling means to control supply of fuel to said misfired cylinder in response to an output of said misfire detection means.

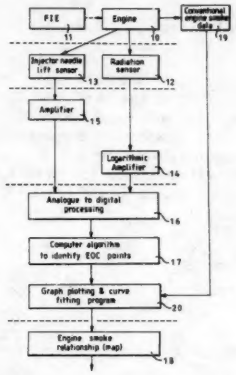
4,987,772

SMOKE MEASURING APPARATUS

Simon J. Lacey, Ipswich, and Roy Haworth, Greenford, both of England, assignors to Lucas Industries, United Kingdom

Filed Oct. 24, 1989, Ser. No. 426,324
Claims priority, application United Kingdom, Oct. 25, 1988, 8824962
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—117.3 3 Claims

2. An apparatus for providing an indication of the level of smoke in the exhaust of a compression ignition engine characterized by a radiation responsive sensor adapted to be mountd on the engine so that it can observe the radiation produced by the combustion of fuel in a combustion chamber of the engine, means for processing the signal produced by the sensor to provide a second signal representing the period of combustion of fuel for various engine operating conditions in the combustion chamber, a data map containing pre-recorded data showing the relationship between the level of smoke and the period of combustion of fuel and means for extracting from said data



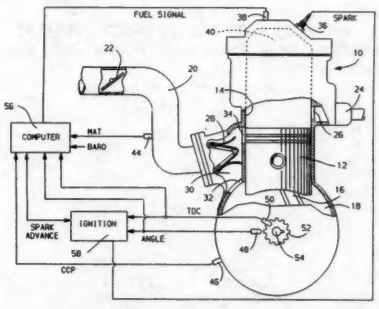
map the level of smoke which corresponds to said second signal.

4,987,773

METHOD AND MEANS FOR DETERMINING AIR MASS IN A CRANKCASE SCAVENGED TWO-STROKE ENGINE

Steven D. Stiles, Clarkston, and Paul E. Reinke, Rochester, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 23, 1990, Ser. No. 483,509
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—118.2 9 Claims



1. In a crankcase scavenged two-stroke engine characterized by an operating cycle including portions during which air is inducted into a crankcase chamber of the engine, is thereafter compressed within the crankcase chamber during a portion of the operating cycle in which the inducted air is trapped in the crankcase chamber while the crankcase chamber undergoes shrinking volume, and is then transferred to the combustion chamber; a method for determining the mass of air transferred to the combustion chamber comprising the steps of:

determining the pressure P of the air mass M within the crankcase chamber at a predetermined point in the operating cycle at which the inducted air is trapped in the crankcase chamber;

determining the volume V of the crankcase chamber at the predetermined point in the operating cycle;

determining the temperature T of the air mass within the crankcase chamber at the predetermined point in the operating cycle; and

deriving an indication of the mass of air M transferred to the combustion chamber in accordance with the expression

$$M=PV/RT$$

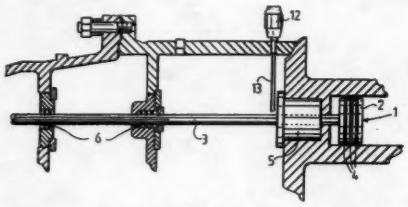
where R is the Universal Gas Constant.

4,987,774

APPARATUS FOR MEASURING THE THICKNESS OF PISTON RIDER RINGS

Cornelis G. De Waal, Gouderak, Netherlands, assignor to Bently Nevada Europa B.V., Netherlands

Filed Oct. 16, 1989, Ser. No. 421,607
Int. Cl.[5] G01M *19/00*
U.S. Cl. 73—120 **18 Claims**



1. Apparatus for measuring the thickness of an element determining the vertical position of a piston in a cylinder of a horizontal reciprocating machine, comprising:

probe means comprising a contactless fixed probe for detecting a vertical distance between said contactless fixed probe and a rod of the piston and for producing an output signal representative of said distance; and

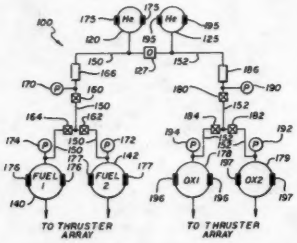
means for calculating the thickness of the element determining the vertical position of the piston from the output signal of said probe means.

4,987,775

PROPELLANT MEASUREMENT SYSTEM

Michael V. Chobotov, Palos Verdes Estates, Calif., assignor to HAC, Los Angeles, Calif.

Filed Oct. 3, 1988, Ser. No. 251,740
Int. Cl.[5] G01F *17/00*
U.S. Cl. 73—149 **1 Claim**



1. A method of measuring the volume of a propellant V_L enclosed at a first pressure P_U within a first tank of a first volume V_T, where the tank volume V_T is equal to the volume of the propellant V_L plus an ullage volume V_U, said method comprising the steps of:

(a) enclosing a pressurization gas of a second volume V_p in a second tank at a second pressure P_p, said second pressure P_p being greater than said first pressure P_U;

(b) injecting a portion of said pressurization gas into said first tank;

(c) measuring the changes in said first and second pressure dP_U and DP_p respectively in response to said injection of said pressurization gas;

(d) measuring the temperatures of said ullage volume T_U and said pressurization gas T_p;

(e) calculating the ullage volume V_U of said first tank using said change in said first and second pressures dP_U and dP_p respectively in conjunction with said first and second volumes V_T and V_p respectively in accordance with the following equation:

$$V_u=(T_u/T_p)*(dP_p*V_p/dP_u);\text{ and}$$

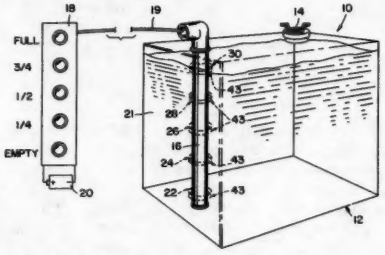
(f) subracting said ullage volume V_u from said first V_T volume to determine said propellant volume V_L.

4,987,776

LEVEL INDICATOR

Terry D. Koon, 1601 N. Rhododendron Dr. #645, Florence, Oreg. 97439

Continuation-in-part of Ser. No. 168,976, Mar. 16, 1988, Pat. No. 4,864,857. This application Sep. 5, 1989, Ser. No. 403,183
Int. Cl.[5] G01F *23/26*
U.S. Cl. 73—304 C **24 Claims**



1. (Amended) A sensing apparatus, comprising:

oscillator sensing means having an oscillator circuit means for outputting an oscillatory signal and a sensing element means associated therewith for radiating an electrostatic field therefrom during operation of said oscillator circuit means, said oscillator sensing means providing a sensing signal output having a voltage level which varies in proportion to changes in such electrostatic field caused by reactions thereof to the proximity of a material or object to be sensed; and

output circuit means, responsive to said sensing signal output from said oscillator sensing means, for outputting a voltage level indicative of the proximity of the sensed object or material to said sensing element means; wherein

said oscillator sensing means further includes a connecting wire interconnecting said oscillator circuit means and said sensing element means, and wherein said connecting wire has a relatively smaller surface area than said sensing element means so as to minimize interference therewith.

4,987,777

LIQUID LEVEL SIGHT GAUGE

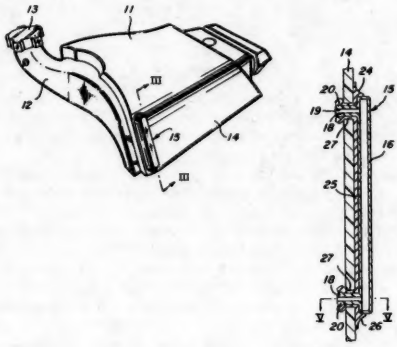
Michel Bourret, Drummondville, and Bernard Guy, Sherbrooke, both of Canada, assignors to Bombardier Inc., Montreal, Canada

Filed Aug. 30, 1989, Ser. No. 400,806
Int. Cl.[5] G01F *23/02, 23/00, 15/04;* B65D *25/54*
U.S. Cl. 73—328 **8 Claims**

1. A sight gauge for mounting between two vertically spaced holes in the wall of a container to provide a visual indication of a liquid level in the container, said sight gauge comprising: an elongate hollow tubular body that is at least partially translucent and has at each end thereof a tubular spigot in communication with the hollow interior of the body, said spigots extending generally parallel to each other and transverse to the length of the body, and each having a free end surrounded by a radially projecting rib located at a spacing from said body that corresponds to the thickness of the container wall; and a gasket of resiliently compressible material extending longitudinally to said body for interpositioning between said body and the container wall, said gasket including

two integrally formed sleeves projecting therefrom at a spacing corresponding to the spacing between said spigots, each said sleeve being of a length corresponding to that of the spigots and sized to closely surround a said spigot, the width of said rib being less than the diameter of the hole and substantially greater than the internal diameter of the sleeve when in unstressed condition, the arrangement being such that with the sleeves positioned in the holes, the free ends of the spigots can be inserted through the interior of the sleeves to bring said ribs to a position wherein they are located on the opposite side of the container wall from said body, such insertion being accommodated by resilient deformation of the sleeves, in the installed position said sleeves being in pressure contact with the spigots and with the surfaces defining said holes to form a liquid-tight seal therewith.

6. A sight gauge for mounting between two vertically spaced holes in the wall of a container to provide a visual indication of a liquid level in the container, said sight gauge comprising: an elongate hollow tubular body that is at least partially translucent and is of low rectangular profile having rounded ends adjacent each of which is a tubular spigot in communication with the hollow interior of the body, said



spigots extending generally parallel to each other and transverse to the length of the body, a gasket of resiliently compressible material extending longitudinally to said body for interpositioning between said body and the container wall, said gasket including integral means for forming a seal and an attachment between said spigots and the corresponding holes in the container wall, wherein said gasket is formed with a recess to receive said body, said recess being bounded by a peripheral wall extending at least part way up the sides of said body, said peripheral wall extending into an angled peripheral skirt.

4,987,778

COMPARATIVE TEMPERATURE COMPENSATING SPECIFIC GRAVITY TEST APPARATUS

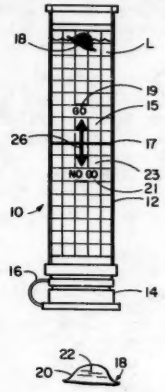
Howard L. Beers, North Fort Myers, Fla., assignor to HF Scientific, Inc., Ft. Myers, Fla.

Filed Jul. 31, 1989, Ser. No. 387,859
Int. Cl.[5] G01N *9/10*
U.S. Cl. 73—449 **23 Claims**

1. A comparative temperature compensating specific gravity test apparatus comprising:

means for holding a test liquid; and

an indicator float element having a predetermined specific gravity and including a pliable sealed container that is substantially free of contained gas and a reference liquid that fills said container; said reference liquid having a thermal expansion characteristic which is substantially the same as that of said test liquid; said container having a mass which is negligible relative to the mass of said reference liquid; and said indicator float element being disposed in said test liquid free of any attachment such that floating of said float element indicates that said test liquid has at least said predetermined specific gravity and sinking



of said float element indicates that said test liquid has less than said predetermined specific gravity.

4,987,779

PULSE-DRIVEN ACCELEROMETER ARRANGEMENT

Gregory J. McBrien, Cromwell, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 28, 1989, Ser. No. 317,217
Int. Cl.[5] G01P *15/13*
U.S. Cl. 73—517 B **2 Claims**

1. An accelerometer arrangement comprising

at least one acceleration sensor including two capacitor plates having respective parallel mutually facing major surfaces which bound a sensing gap therebetween, a plate-shaped electrically chargeable proof mass, and means for resiliently mounting said proof mass in said gap in parallelism with said major surfaces for displacement in response to the action of acceleration forces thereon out of a substantially central rest position toward one or the other of said major surfaces depending on the direction f said acceleration forces;

means for establishing an electrical potential difference between said capacitor plates to generate respective electrostatic fields between said capacitor plates and said proof mass which cause a proof mass electrical potential variation having a magnitude and sense depending on the extent and direction of said displacement of said proof mass out of said rest position thereof, including means for applying to said capacitor plates respective D.C. voltages which are at substantially constant different levels; and

means for evaluating said variation and for supplying to said proof mass an electrical control signal sufficient to establish on said proof mass a voltage that is proportionate to said variation and at which electrostatic forces caused thereby between said proof mass and said capacitor plates return said proof mass to said rest position thereof against said action of said acceleration forces thereon, including means for generating a train of pulses which alternate between at least two voltage levels and the succession, duration and sense of which are such that the time average of said pulses substantially establishes said voltage on said proof mass,

said generating means including a D.C. source, switching means connected to said source and having an output connected to said proof mass, means for controlling said switching means to issue said pulse train at said output thereof; and

said evaluating means further including means for detecting

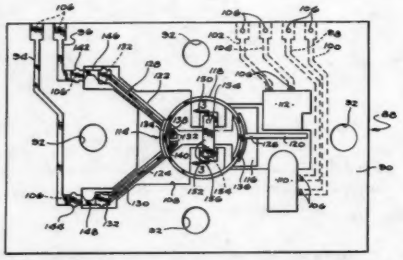
the effects of said pulse train on the potentials appearing at said capacitor plates and issuing an output signal representative thereof, means for demodulating said output signal with said pulse train, and means for supplying the thus demodulated signal to said controlling means to cause the latter to control the waveform of said pulse train in dependence on the value of said demodulated signal.

4,987,780

INTEGRATED ACCELEROMETER ASSEMBLY

Henry C. Abbink, Westlake Village, and Nicholas F. Pier, Thousand Oaks, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Nov. 16, 1987, Ser. No. 121,088
Int. Cl.[5] G01P *15/08, 15/13*
U.S. Cl. 73—517 B 7 Claims



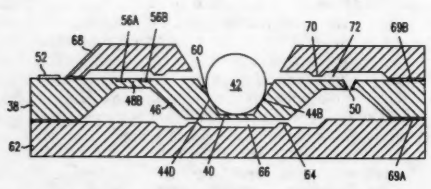
1. An integrated accelerometer comprising, in combination:
(a) a planar support base having a central aperture;
(b) a pendulous member including two arms;
(c) a pair of spaced flexible hinges, a first end of each of said hinges being welded to said support base and a second end of each being welded to one of said arms whereby said pendulous member is pivotally supported within said aperture
(d) a pair of limit stops welded to opposed sides of said support base for limiting the movement of said pendulous member; and
(e) said support base includes a plurality of copper filled apertures for anchoring said hinge welds and said limit stop welds and said pendulous member includes a plurality of copper filled apertures for anchoring said hinge welds.

4,987,781

ACCELEROMETER CHIP

Hans Reimann, Sunnyvale, Calif., assignor to SenSym, Incorporated, Sunnyvale, Calif.

Filed May 3, 1989, Ser. No. 347,598
Int. Cl.[5] G01P *15/08*
U.S. Cl. 73—517 R 17 Claims



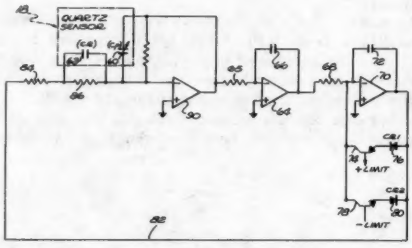
1. A semiconductor chip accelerometer comprising:
a semiconductor substrate;
resistance means formed in the semiconductor substrate for providing an electric resistance as a function of force on the substrate;
a cavity defined by the substrate; and
a body fixed in the cavity for exerting a force on the substrate.

4,987,782

CAPACITIVE PRESSURE TRANSDUCER SYSTEM

Zvi Shkedi, Worcester, Mass.; James S. Lepkowski, Glendale, Ariz.; Karl S. Pogany, Jr., and Gerald W. Meyer, both of Tucson, Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Oct. 3, 1989, Ser. No. 416,698
Int. Cl.[5] G01L *9/12*; H03B *19/05*
U.S. Cl. 73—718 11 Claims



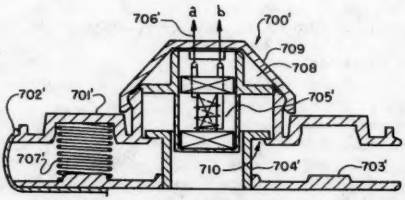
2. A capacitive pressure transducer system comprising a differential pressure transducer including a first capacitor C_R exposed to a reference pressure and a second capacitor C_P exposed to a variable pressure,
characterized in that said system comprises an oscillator including a differentiator-inverter stage wherein each of said capacitors C_R and C_P are connected to a common point and first and second resistors are connected in parallel with each of said capacitors with said common point connected to the inverting terminal of a first operational amplifier, a feedback line connected from the output of said first operational amplifier to said second resistor opposite said common point, first and second integrator circuits connected to the output of said first operational amplifier, a limit circuit connected across the output of said second integrator circuit, and feedback means connected from the output of said second integrator circuit to the input of said inverter stage, such that the period of oscillation of said oscillator is proportional to the square root of the ration C_P/C_R.

4,987,783

SENSOR AND TRANSDUCER APPARATUS

Nicholas F. D'Antonio, 7695 Admiral Dr., Liverpool, N.Y. 13090, and Nicholas J. D'Antonio, 119 Softwind Cir., Baldwinsville, N.Y. 13027

Continuation-in-part of Ser. No. 834,939, Feb. 28, 1986, Pat. No. 4,823,619. This application Feb. 2, 1988, Ser. No. 151,483
Int. Cl.[5] G01L *1/14*
U.S. Cl. 73—862.64 2 Claims



1. A sensing device for generating an electric reactance signal in response to an environmental parameter for transmis-

sion to an oscillator at a remote location, said device comprising:

reactance means having a first portion and a second portion movable relative to the first portion for generating said electric reactance signal, said first portion of said reactance means comprises a first reactance member and positioning structure having at least one first locating surface fixed relative to said first reactance member,

first supporting means for supporting said first portion of said reactance means, said first supporting means comprises at least one second locating surface for engaging said first locating surface of said positioning structure to accurately locate said first reactance member relative to said first supporting means, and at least one third locating surface;

said second portion of said reactance means comprises at least one fourth locating surface for engaging said third locating surface of said first supporting means, and at least one fifth locating surface; and

second supporting means for supporting said second portion of said reactance means, wherein said second supporting means includes at least one sixth locating surface for engaging said fifth locating surface of said second portion to accurately locate said second portion in said second supporting means; the engagement of said fourth locating surface and said third locating surface accurately locating said first and second portions of said reactance means relative to each other,

wherein said first portion of said reactance mans comprises an inductor coil and said second portion of said reactance means comprises an inductor shield.

4,987,784

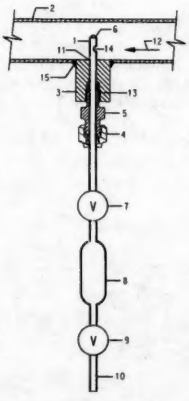
PARTICLE SAMPLE DEVICE

Sammy B. Presgrove, 2206 Edgewood Dr., Augusta, Ga. 30904

Filed Jan. 12, 1990, Ser. No. 464,400

Int. Cl.[5] G01N *1/20*

U.S. Cl. 73—863.52 **1 Claim**



1. An apparatus for sampling particles flowing with liquid through a conduit, said apparatus comprising: a hollow tube whose longitudinal axis is positioned in a substantially vertical position and extending through a wall of the conduit, the tube having a closed upper first end and having at least one particle entry opening in a wall portion of the tube adjacent to the first end, the at least one particle entry opening facing substantially upstream of said liquid flow;

a sample collector fluidly coupled to the second end of the tube positioned outside of the conduit to receive particles;

a first valve positioned between the second end of the tube and the sample collector; and

a second valve to remove particles from the sample collector;

Whereby during sampling the first valve is opened and particles enter the at least one entry opening as liquid flows passed the tube subsequently falling downward due to gravity only and into the sample collector, whereby sampled particles may be removed from the sample collector by opening the second valve so that the sampled particles may fall, and whereby the sample collector may be emptied.

4,987,785

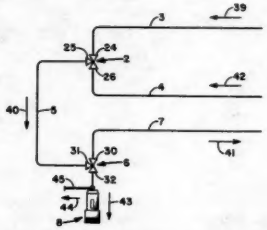
CONSTANT VOLUME SAMPLING SYSTEM

R. Wilson Spencer, P.O. Box 22586, Houston, Tex. 77227-2586

Filed Apr. 4, 1990, Ser. No. 505,051

Int. Cl.[5] G01N *1/18, 1/28*

U.S. Cl. 73—863.71 **15 Claims**



1. A constant volume sampling system, comprising:

a. a sample loop including a section of tubing having a predetermined volume and having a first end and a second end;

b. a first valve having a first port, connectable to a process line at a first point, a second port connected to said first end of said sample loop, a third port, connectable to a pressurized gas line, and a selector means for selectively establishing flow between said first and second ports or between said second and third ports;

c. a second valve having a first port, connectable to said process line at a second point wherein the pressure in said process line is less than the pressure at said first point, a second port, connected to said second end of said sample loop, a third port, connectable to a sample means for receiving a sample, and a selector means for selectively establishing flow between said first and second ports or between said second and third ports;

d. an actuator means, for operating said first valve and said second valve; and

e. a linkage means, for mechanically linking said actuator means and said first and second valves such that said actuator means operates said first and second valves simultaneously, said linkage means being operable connected externally of said sample loop to said first valve, said second valve and said actuator means.

4,987,786

COAXIAL ENGINE STARTER WITH SPACED OUTPUT SHAFT BEARINGS

Akira Morishita, and Shuzo Isozumi, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 2, 1989, Ser. No. 430,540

Claims priority, application Japan, Nov. 2, 1988, 63-277750; Nov. 2, 1988, 63-277751

Int. Cl.[5] F02N *15/06*

U.S. Cl. 74—7 C **4 Claims**

1. A coaxial engine starter, comprising:

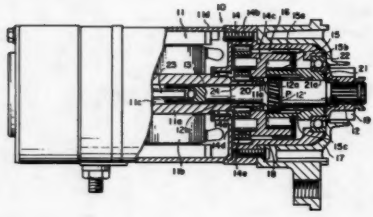
an electric motor having a tubular armature rotary shaft (**11***a*) defining therein an inner passage (**11***c*);

an axially slidable output rotary shaft (**12**) disposed at a front

end of said electric motor and having at one end thereof a pinion (19) adapted to be engaged with a ring gear of an engine and inserted at the other end into said inner passage of said armature rotary shaft;

a unidirectional clutch (15), including a clutch inner member (15*b*) having helical splines (15*c*) formed in an inner circumference thereof, for transmitting a rotation of said armature rotary shaft to said output rotary shaft;

a helical spline portion (12*a*) formed in an outer circumference of said output rotary shaft and in engagement with said helical splines of said clutch inner member of said unidirectional clutch;



a bearing surface defined on an inner circumference of said clutch inner member for rotatably and slidably supporting said output rotary shaft; and

a bearing (13) fitted within an inner circumferential surface of said inner passage of said tubular armature rotary shaft of said electric motor for rotatably and slidably supporting said output rotary shaft, wherein said bearing surface is an inner circumferential cylindrical surface (21*a*) of a hollow cylindrical member (21) integrally extending forward from said clutch inner member.

4,987,787

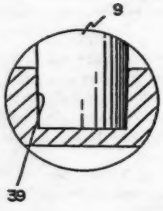
TRANSMISSION MECHANISM FOR MUSIC BOX ORNAMENT

Jack Hou, P.O. Box 78-95, Taipei, Taiwan

Continuation of Ser. No. 204,507, Jun. 9, 1988. This application Feb. 6, 1990, Ser. No. 475,984

Int. Cl.[5] **A63H** *5/00*

U.S. Cl. 74—49 **1 Claim**



1. A mechanism for transmitting the power output of a power drive source to an ornament for imparting a desired movement thereto, which mechanism comprises:

(a) a casing defining an internal compartment and including a wall provided with an aperture therethrough;

(b) a wind-up music box including a rotary power output shaft extending outwardly therefrom, the music box being disposed within the internal compartment of the casing and being substantially fully enclosed thereby;

(c) a drive wheel carried by the power output shaft and directly rotated thereby, the drive wheel including an elongate drive stub extending outwardly from one side thereof, the longitudinal axis of the drive stub being positioned eccentrically with respect to the power output shaft axis of rotation and parallel thereto;

(d) a slide link including a longitudinal slot formed therein and a pair of spaced guide holes at opposite ends of the slide link, the drive stub being engaged within the longitudinal slot;

(e) guide means including a pair of stationary parallel guide rods, each guide rod being slidably received through a guide hole of the slide link;

(f) a bushing assembly including a threaded stem provided with a longitudinal channel therethrough and a lock nut, the threaded stem being disposed through the aperture in the wall of the casing and secured to the wall by the lock nut;

(g) a tappet rod journalled for sliding movement through the longitudinal channel of the threaded stem, the tappet rod including a first end disposed within the internal compartment of the casing and secured to the slide link, and a second end disposed exteriorly of the casing for mounting an ornament thereon; and

(h) whereby when the drive wheel is rotated by the power output shaft of the wind-up music box, the slide link is caused to reciprocate vertically on the guide rods and impart a corresponding reciprocating movement to the tappet rod and ornament mounted thereon.

4,987,788

ELECTRIC MOTOR-DRIVEN POSITIONING ELEMENT

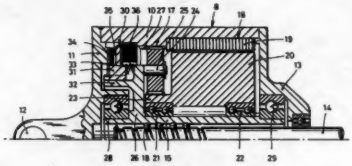
Paul Bausch, Hattenheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 23, 1989, Ser. No. 425,135

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836255

Int. Cl.[5] **F16H** *25/22, 1/28;* **B62D** *7/14*

U.S. Cl. 74—89.15 **8 Claims**



1. An electric motor-driven positioning element for steering a rear wheel of a passenger car, including a housing with a positioning member in the form of a ball screw which is adapted for axial displacement effected by a rotatable ball nut, and wherein the ball nut is driven by an electric motor via a planetary gear unit, with the rotor of the electric motor driving a sun gear, and the sun gear intermeshing with planetary pinions driving the ball nut, the improvement wherein: the ball nut is a hollow shaft, and the rotor of the electric motor is rotatably mounted on the ball nut.

4,987,789

SWIVEL DISK FRICTION GEARING

Ulrich Rohs, Roonstrasse 11, D-5160 Duren; Dietmar Heidingsfeld, Bodelschwinghstrasse 36, and Herbert Meuter, An der Weingass 24, both of D-5100 Aachen, all of Fed. Rep. of Germany

Filed Jan. 5, 1989, Ser. No. 293,635

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1988, 3800170

Int. Cl.[5] F16H *15/08*

U.S. Cl. 74—200 6 Claims

1. In a swivel disk friction gear system of the type mounted within a housing and having a drive shaft and a driven shaft, said gear system comprising:

a driving part having a concave outer surface mounted on the drive shaft;

a coaxial driven part having a concave outer surface rotatably mounted on the drive shaft and operatively coupled to the driven shaft;

a set ring mounted between the driving and driven parts moveable in the axial direction thereof;

a swivel disk having a convex outer surface pivotably mounted on said set ring for free pivoting with respect thereto and frictionally engaging said concave surface of said driving and driven parts;

a cylindrical bore in said driven part, being axially displaceable towards the driven part;

a piston plate fixed to said drive shaft and mounted within said cylindrical bore in a manner defining a closed space therebetween and for relative movement therewith upon the axial displacement of said driving part;

means for introducing pressurized fluid medium into said space within said cylindrical bore between said piston and said driven part;

a pump integral to the drive shaft and actuated by the rotation thereof for pressurizing said pressurized fluid medium, said pump producing sufficient pressure to axially move said driving part produce, via said swivel disk, a frictional engagement between said driving and driven parts;

the improvement which comprises

means for controlling the pressure of said pressurized fluid medium to vary the force of said frictional engagement;

said pump comprising;

on the drive side of the gear system, oppositely to said concave outer surface of said driving part, and rigidly connected and rotating with said driving part a cylindrical pump casing having on its drive side a blind bore adapted to rotatably receive the free end of an input shaft for coupling with said drive shaft;

said pump casing having at least two radial cylindrical bores therein;

and in each of said bores a radially slidably piston supported therein on a pressure spring, said pistons having radially free outer ends projecting beyond the radially outer ends of said bores;

a hollow coupling part having a bell-like inner surface surrounding the free ends of the pump pistons, said coupling part rotating with the input shaft but being axially displaceable with respect thereto, said inner surface forming a control cam surface limiting the radial movement of said pump pistons, said cam surface having a first diameter at a closed end and then expanding toward an open end;

a radially extending suction conduit formed within said input shaft for conducting the medium to the pump prior to pressurization; and,

a pressure duct formed within said input shaft and leading from said cylindrical bores to an inner end surface of the input shaft.

4,987,790

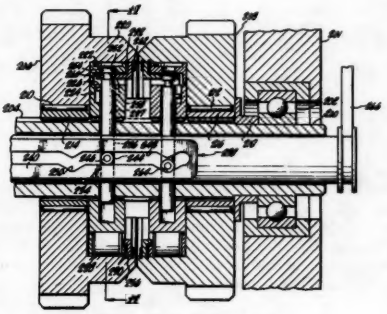
TRANSMISSION

Peter H. Weismann, 1631 Indus St., Santa Ana, Calif. 92707

Continuation-in-part of Ser. No. 19,217, Feb. 26, 1987, Pat. No. 4,817,451. This application Apr. 4, 1989, Ser. No. 333,599

Int. Cl.[5] F16H *3/10*

U.S. Cl. 74—333 7 Claims



7. An engagement mechanism comprising

a hollow shaft;

an engagement outer rotatably mounted about said shaft and including an outer race;

an engagement inner about said hollow shaft and angularly fixed relative thereto, said engagement inner including an inner race having a plurality of central depressions with two inclined surfaces extending upwardly and outwardly in opposite directions from each said central depression;

wedging elements between said inner race and said outer race;

a cage between said inner race and said outer race, said cage retaining said wedging elements and being angularly movable relative to said inclined surfaces to selectively couple said engagement outer and said engagement inner through said wedging elements with either of said two inclined surfaces, said cage having a firs actuator portion;

an actuator mounted in said hollow shaft and angularly fixed relative to said engagement inner, said actuator including a second actuator portion selectively engaging said first actuator portion to angularly displace said cage relative to said inclined surfaces for alignment of said wedging elements with said central depressions and selectively disengaging said first actuator portion to allow movement of said cage for movement of said wedging elements along said inclined surfaces to engage said outer race.

4,987,791

MINIATURE MOTOR WITH A WORM REDUCTION GEAR

Hiroaki Nakahashi; Tsutomu Saya, and Junichi Yamazaki, all of Matsudo, Japan, assignors to Mabuchi Motor Company, Ltd., Chibaken, Japan

Continuation of Ser. No. 314,818, Feb. 23, 1989, abandoned. This application Feb. 20, 1990, Ser. No. 483,334

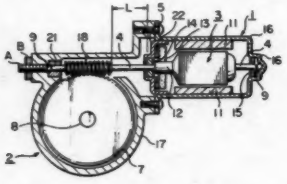
Claims priority, application Japan, Mar. 4, 1988, 63-28870

Int. Cl.[5] F16H *1/16*

U.S. Cl. 74—425 1 Claim

1. A miniature motor and worm reduction gear arrangement, comprising: a gear case; a motor housing connected to said gear case, a miniature motor positioned within said motor housing connected to a motor shaft and a first motor shaft bearing in a first end of said housing and a second end of said motor shaft bearing at a second end of said housing, each of said first and second motor shaft bearings supporting said motor shaft for rotation; a third motor shaft bearing supported by said gear case, said third motor shaft bearing for rotatably

supporting said motor shaft; a worm gear element including a shaft hole into which said motor shaft is inserted, said worm gear element being fixedly fitted to said motor shaft by press-fitting said motor shaft to said shaft hole of said worm element, said worm gear element being positioned within said gear case; a worm wheel positioned within said gear case engaging said



worm gear element, said motor shaft having a diameter ϕ, said worm gear being positioned to define a distance L between said worm gear and said second motor shaft bearing such that the distance L between said worm gear and said second motor shaft bearing is at least six times as large as the diameter of said motor shaft ϕ.

4,987,792

SHIFTING ARRANGEMENT FOR AN AUTOMATIC TRANSMISSION OF A MOTOR VEHICLE

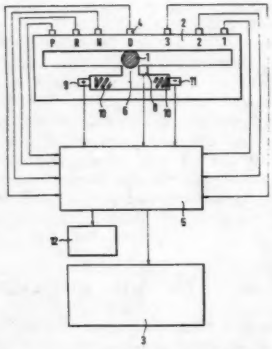
Robert Mueller, Mönsheim; Ulrich Maier, Freiberg, and Friedrich Raff, Eberdingen, all of Fed. Rep. of Germany, assignors to Dr. Ing. H. C. F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,387

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807881

Int. Cl.[5] B60K *20/00*

U.S. Cl. 74—473 R **18 Claims**



1. A shifting arrangement for an automatic transmission of a motor vehicle controlled by an electronic control means to change transmission speeds in response to the position of a selector lever means, the different transmission speeds to be automatically engaged being preselectable by pivoting of the selector lever means in a first shifting lane to one of a plurality of positions wherein the position of the selector lever means would cause the control means to select a particular speed, with the control means in at least one of the positions of the selector lever means operable to automatically change the selected particular speed to another one of a plurality of speeds, the selector lever means being shiftable by way of a transverse lane into other positions in a second shifting lane parallel to the first shifting lane, and the forward speeds of the transmission being manually selected by a driver via the electronic control means in response to movement of the selector lever means to the other positions in the second shifting lane.

4,987,793

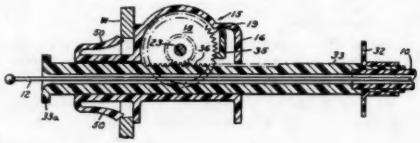
CABLE CONTROL SYSTEM WITH ADJUSTMENT DEVICE

John M. Baumgarten, West Bloomfield, and Adam W. Chaczyk, Sterling Heights, both of Mich., assignors to Babcock Industries, Inc., Fairfield, Conn.

Filed Jan. 4, 1990, Ser. No. 460,809

Int. Cl.[5] F16C *1/10*

U.S. Cl. 74—502 **10 Claims**



1. A cable control system including an adjustment device comprising

a housing,

a conduit fitting having teeth thereon mounted for reciprocating movement within said housing and adapted to be connected to the conduit of a cable system through which a cable strand extends,

a ratchet gear rotatably mounted in the housing and supporting a pinion gear which engages teeth on the conduit fitting member,

said ratchet gear having gear teeth with a pitch diameter greater than the pitch diameter of the teeth on the 13 pinion gear and the teeth on the pinion gear being larger than the teeth on the ratchet wheel so that there are a greater number of teeth on the ratchet wheel than on the pinon, and

a retractable ratchet detent engaging the teeth on the ratchet wheel.

4,987,794

STROKE ADJUSTING APPARATUS FOR A PUNCHING PRESS

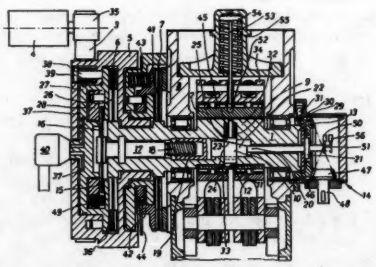
Martin Brunner, and Helmut Messner, both of Arbon, Switzerland, assignors to Bruderer A.G., Arbon, Switzerland

Filed Aug. 28, 1989, Ser. No. 399,707

Claims priority, application Switzerland, Aug. 31, 1988, 3240/88

Int. Cl.[5] F16H *21/20*

U.S. Cl. 74—571 M **10 Claims**



1. In a stroke adjusting apparatus for adjusting the stroke of a punching press, said punching press having a frame, an eccentric shaft rotatably on said frame, an eccentric bushing rotatably supported on said eccentric shaft, whereby said eccentric shaft and bushing form a double eccentric, a drive

flywheel, drive means for rotating said drive flywheel, a first a disk clutch operative between said drive flywheel and said eccentric shaft to make and break a drive connection between said drive flywheel and said eccentric shaft, a disk brake operative on said eccentric shaft, and a spring biassed locking pin guided in a radial bore in said eccentric shaft and operative to selectively lock said eccentric bushing to said eccentric shaft, the improvement comprising:

a control mechanism extending through said eccentric shaft; and

a further disk clutch operative between said control mechanism and said drive flywheel for operating said control mechanism with said drive flywheel,

said control mechanism being operative to control movement of said locking pin into and out of said eccentric bushing, and

said drive means comprising a positionable drive.

4,987,795

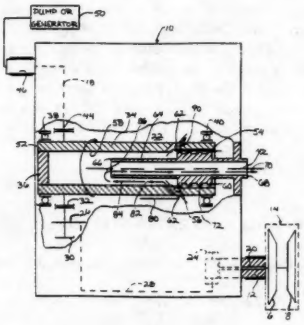
VENTED TRANSMISSION

Tuan H. Nguyen, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 3, 1989, Ser. No. 431,398

Int. Cl.[5] F16H *57/02*

U.S. Cl. 74—606 R **9 Claims**



1. A vented transmission comprising:

a housing;

a rotary input to said housing;

a rotary output from said housing;

transmission means within said housing interconnecting said input and said output and including a hollow, rotary shaft journaled within said housing;

a vent tube having a first end extending into one end of said hollow shaft and a second end in fluid communication with the exterior of said housing;

a shoulder within said hollow shaft and intermediate the ends of said vent tube and defining a relatively smaller diameter section near said first end of said vent tube that is within said hollow shaft and a relatively larger diameter section nearer said second end of said vent tube;

at least one aperture extending through said hollow shaft from said larger diameter section immediately adjacent said shoulder; and

a labyrinth seal at the interface of said vent tube and said larger diameter section at a location between said aperture (s) and said second end of said vent tube.

4,987,796

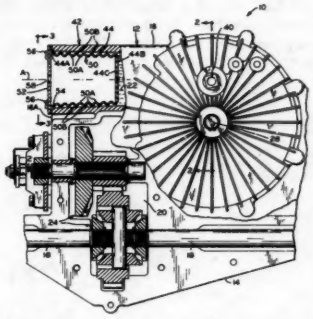
INTERNAL RESERVOIR-DEFINING BODY FOR PERMITTING OIL EXPANSION WITHIN A HYDROSTATIC TRANSMISSION HOUSING

Roland L. von Kaler, Tecumseh, Mich., and William A. Gremminger, Aston, Pa., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Jun. 12, 1989, Ser. No. 364,897

Int. Cl.[5] F16H *57/02*; F16D *31/02*

U.S. Cl. 74—606 R **16 Claims**



1. A hydrostatic transmission having a housing defining a chamber containing transmission fluid, a pump in said chamber, input shaft means extending through said housing for driving said pump, a motor in said chamber fluidly connected to said pump and driven by said pump, output shaft means connected to said motor and extending out of said housing for transmitting mechanical motion of said motor, and a fluid expansion reservoir, comprising:

a yieldly compressible hollow body of resilient, spring-like material, said hollow body mounted within said chamber of said housing and being sealably attached at an open end of said hollow body to said housing;

said hollow body having an exterior surface in contact with said fluid in said housing chamber and an interior surface in communication with ambient atmosphere at the exterior of said housing;

said hollow body including means for biasing said hollow body to an expanded condition in which said hollow body decreases the effective volume of said chamber to maintain said chamber substantially full of said fluid, said hollow body being compressible, by increase in pressure on said exterior surface from expansion of said fluid in said chamber, from said expanded condition to a compressed condition in which said hollow body increases the effective volume of said chamber and thereby accommodates expansion of said fluid in said chamber.

4,987,797

Patent Not Issued For This Number

4,987,798

HYDRAULIC CONTROL DEVICE FOR AUTOMATIC TRANSMISSION FOR VEHICLE WITH HIGH ACCURACY REVERSE INHIBITION SYSTEM

Makoto Funahashi; Hiroshi Itoh, both of Toyota; Tokuyuki Takahashi, Aichi, and Mitsuru Takada, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 2, 1989, Ser. No. 388,611

Claims priority, application Japan, Aug. 2, 1988, 63-192965; Sep. 22, 1988, 63-238146; Sep. 22, 1988, 63-238145

Int. Cl.[5] B60K *41/06*

U.S. Cl. 74—868 **3 Claims**

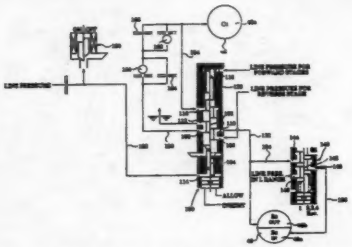
1. A hydraulic control device for an automatic transmission for a vehicle such as an automobile of a type including a first

friction engaging means adapted to be supplied with a hydraulic pressure only for setting up a reverse stage and a second friction engaging means adapted to be supplied with a hydraulic pressure for setting up the reverse stage and a certain forward speed stage, comprising:

means for supplying a reverse hydraulic pressure when the reverse stage is to be set up,

a first passage means for conducting said reverse hydraulic pressure to said first friction engaging means and including a parallel connection of a throttling means and a check valve oriented to allow fluid to flow only in a direction of exhausting fluid from said first friction engaging means,

a second passage means for conducting said reverse hydraulic pressure to said second friction engaging means, and



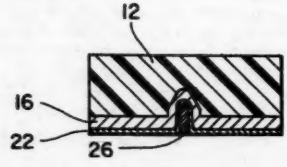
a reverse inhibition valve having a valve element, an inhibition port adapted to be supplied with a control hydraulic pressure when reverse inhibition is required for biasing said valve element toward an inhibition position for interrupting supply of said reverse hydraulic pressure to said first and second passage means, and a hold port adapted to be supplied with said reverse hydraulic pressure supplied to said first friction engaging means after having passed through said throttling means for biasing said valve element toward an allowance position opposite to said inhibition position for transmitting said reverse hydraulic pressure to said first and second passage means.

4,987,799

STAMPING DIE REPLICA AND METHOD OF MANUFACTURE THEREOF

Elliott Soth, 6806 Hawthorne, Cary, Ill. 60013

Filed Aug. 18, 1989, Ser. No. 395,972
Int. Cl.[5] B21D *37/20*; C25D *1/10*
U.S. Cl. 76—107.1 **17 Claims**



1. A method of making replicas of a master stamping die having a master die pattern in relief, comprising:

making a negative mold of said master stamping die having a negative mold cavity pattern corresponding to said master die pattern;

electrodepositing one or more layers of die forming material on said negative mold to create a replica die electroform having a cavity pattern like said mold cavity pattern;

making a thin electrically insulative shield having an opening pattern having generally the outline of said electroform cavity pattern;

laminating said shield on said replica die electroform, with said opening pattern aligned with said electroform cavity pattern; and

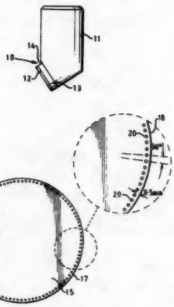
electrodepositing a die material into said electroform cavity pattern through said opening pattern in said shield to fill said electroform cavity pattern.

4,987,800

CUTTER ELEMENTS FOR ROTARY DRILL BITS

Joseph A. Gasan, Stroud; Malcolm R. Taylor, Gloucester, and Phillip Bex, Camberley, all of England, assignors to Reed Tool Company Limited, Gloucestershire, England

Filed Jun. 26, 1989, Ser. No. 371,711
Claims priority, application United Kingdom, Jun. 28, 1988, 8815333; Apr. 28, 1989, 8909875
Int. Cl.[5] B21K *5/02*; E21B *10/46*
U.S. Cl. 76—108.2 **21 Claims**



19. A method of forming a preform cutting element including a layer of superhard material having a front cutting face, a rear face, a peripheral surface, and a cutting edge provided by at least part of the junction between the front cutting face and the peripheral surface, the method including the step of forming in the layer a plurality of spaced apertures each of which extends at least partly into the layer of superhard material from an opening in the cutting face thereof, which openings are adjacent the cutting edge.

4,987,801

METHOD AND APPARATUS FOR STRIPPING A WIRE END

Joseph E. Brown, 4603 Candlelight La., Apt. 5, Liverpool, N.Y. 13090

Filed Nov. 20, 1989, Ser. No. 439,195
Int. Cl.[5] H02G *1/12*
U.S. Cl. 81—9.4 **13 Claims**

1. In a rotary wire stripper for stripping an end of a coaxial cable of the type having a center conductor encapsulated in one or more layers of insulation and conductive shields, the combination comprising:

a rotary cutting head having a central wire end receiving aperture therein;

a cutting blade carrier block mounted in said cutting head for reciprocal sliding motion along a diameter of said cutting head;

a central aperture in said carrier block in axial alignment with the axis of said cutting head;

at least one cutting blade mounted in said carrier block projecting into said central aperture;

an actuating weight mounted on said carrier block on the opposite side of the axis of said cutting head from said cutting blade;

means urging said carrier block to one end of said diameter to hold said cutting blade in the inoperative position; and

means for rotating said rotary cutting head so that upon rotation of said cutting head said carrier block is propelled to the other end of said diameter to engage said cutting blade with a wire end positioned in said wire end receiving aperture.

4,987,802

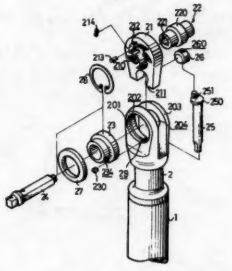
POWER WRENCH

Shyh Y. Chern, No. 111, Lane 41, Sec. 1, Hsin Jen Rd., Ta Li Hsiang, Taichung Hsien, Taiwan

Filed Apr. 9, 1990, Ser. No. 507,368

Int. Cl.[5] B25B *13/46*

U.S. Cl. 81—57.39 **2 Claims**



1. A power wrench comprising generally a head portion and a handle portion extending therefrom, two lugs, each having an opening, being integrally formed on one end of said head portion, a socket being rotatably supported between said lugs by one of said lugs and a retainer which is disposed in said opening of an other lug, said retainer which has a center hole substantially embracing one end of said socket, a drive shaft being received in said socket; a yoke which has an aperture being rotatably supported on a substantially intermediate portion of said socket, a cavity being formed in a neck portion of said yoke, a pivot ball being disposed eccentrically on an upper end of a driving axle and being slidably received within said cavity of said yoke, said neck portion of said yoke being actuated to make a reciprocating arcuate motion by said driving axle, characterized in that a plurality of first grooves are formed around said aperture of said yoke, each said first groove gradually changes from narrow to wide; a first roller and a first spring are disposed within each said first groove, in which said first roller is located closer to a narrower end of said first groove, said first rollers slidably contact said intermediate portion of said socket; at least one second groove is formed around said center hole of said retainer, said second groove gradually changes, in a direction similar to that of said first groove, from narrow to wide; a second roller and a second spring are received in each said second groove, said second roller slidably contact said one end of said socket; when said yoke rotates in one direction so that said first rollers are caused to move toward said narrower ends of said first grooves, said first rollers cause said socket to rotate; and when said yoke rotates in a reverse direction, said second roller is caused to hold said socket and prevent said socket from backlash, and said first rollers are caused to mvoe toward a wider end of each said first groove so that said yoke can freely rotate backwards.

4,987,803

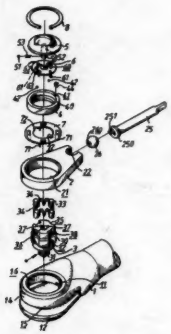
POWER WRENCH

Shyh Y. Chern, No. 111, Lane 41, Sec. 1, Hsin Jen Rd., Ta Li Hsiang, Taichung Hsien, Taiwan

Filed Apr. 9, 1990, Ser. No. 507,369

Int. Cl.[5] B25B *13/46*

U.S. Cl. 81—57.39 **2 Claims**



1. A power wrench comprising generally a head portion and a handle portion extending therefrom, two lugs, each having an opening, being integrally formed on one end of said head portion, a socket being rotatably supported between said lugs by one of said lugs and a retainer which is disposed in said opening of an other lug, said retainer which has a center hole substantially embracing an upper end of said socket, a drive shaft being integrally formed on a lower end of said socket; a yoke which has an aperture being rotatably supported on a substantially intermediate portion of said socket, a cavity being formed in a neck portion of said yoke, a pivot ball being disposed eccentrically on an upper end of a driving axle and being slidably received within said cavity of said yoke, said neck portion of said yoke being actuated to make a reciprocating arcuate motion by said driving axle, characterized in that a plurality of first recesses are formed on an outer peripheral surface of said intermediate portion of said socket, said first recesses are substantially arcuate; a roller is received in each said first recess; a spring element is biased between every two adjacent rollers; two second recesses are formed on an outer peripheral surface of said upper end of said socket; a ball is received in each said second recess; said rollers and said balls are disposed in one end of said recesses; when said yoke is actuated to rotate in one direction, said rollers are caused to clamp and drive said socket to rotate in said one direction; and when said yoke is actuated to rotate in a reverse direction, said rollers can not clamp said socket, and said balls clamp said socket in order to prevent said socket from rotating in said reverse direction.

4,987,804

STRAP WRENCH

Steven C. Greenawalt, Reading, Pa., assignor to Easco Hand Tools, Inc., Lancaster, Pa.

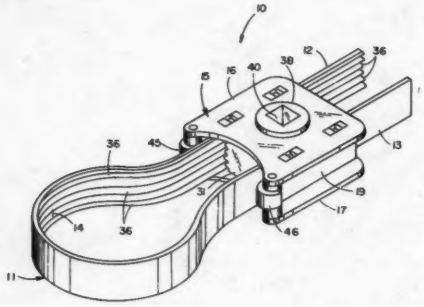
Filed May 17, 1990, Ser. No. 524,586

Int. Cl.[5] B25B *13/52*

U.S. Cl. 81—64 **15 Claims**

1. A strap wrench for engaging a workpiece, the strap wrench comprising: a flexible strap means having a first end, a second end, and an intermediate portion therebetween; a housing having a first opening and a second opening therein through which the respective first and second ends of the flexible strap means may be removably inserted such that a flexible loop is formed in the intermediate portion of the flexible strap means, said loop being formed securely about the workpiece; the housing further having a first side, a second

side, a top having an opening therein, a bottom having an opening therein, the openings in the top and bottom being substantially aligned with one another; a cam means movably disposed within the housing such that the first opening in the housing is formed between the cam means and the first side of the housing and the second opening in the housing is formed between the cam means and the second side of the housing, the



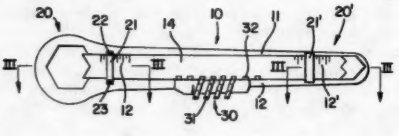
cam means further having an opening therethrough communicating with the openings in the top and bottom of the housing such that a tool means may be inserted in the opening to adjust the cam means thereby locking the strap means between said cam means and the side of the housing to prevent movement of the strap means therebetween, such that rotation of the tool means produces concomitant rotation of the workpiece.

4,987,805

ADJUSTABLE EYEBOLT KEY

Eugen E. Ejdenwik, Eskilstuna, Sweden, assignor to Noren & Persson AB, Strangnas, Sweden

Filed Oct. 2, 1989, Ser. No. 415,902
Int. Cl.[5] B25B *13/14*
U.S. Cl. 81—77 **3 Claims**



1. An adjustable eyebolt key comprising:

a flat stem element having a first end with a first key ring thereat, and a second, opposite end with a second key ring thereat, said first and second key rings having different gripping dimensions, said stem element including side limiting bars extending along a length thereof and an underside center section connecting said side limiting bars and having a thickness less than that of said limiting bars so as to define a recess between an upper planar surface of said underside center section and upper surfaces of said limiting bars, a tongue means for cooperation with said key rings to grip a workpiece and being slidable and guided on along the upper surface of said underside center section; at least one of said tongue means and said stem element includes a bore for lubrication and cleaning;

worm drive means on said stem element for actuating said tongue means to move along said stem elements such that said tongue means selectively extends into and retracts out of said key rings so as to adjust the grip of each of said key rings; and

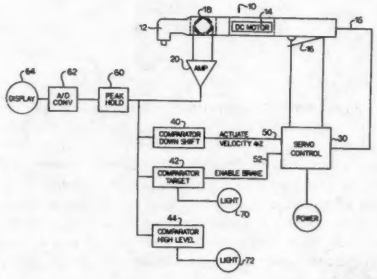
cross-tie means including a first cross-tie fixedly attached to the stem element and overlying said tongue means to secure said tongue means on said stem element and a second cross-tie pivotally attached to the stem element and overlying said tongue means to removably secure said tongue means on said stem element.

4,987,806

ELECTRONIC CONTROL CIRCUITRY FOR A NUTRUNNER

Mark W. Lehnert, Hoffman Estates, Ill., assignor to GSE, Inc., Farmington Hills, Mich.

Continuation of Ser. No. 309,406, Feb. 13, 1989, abandoned.
This application Aug. 15, 1990, Ser. No. 568,537
Int. Cl.[5] B25B *23/151*
U.S. Cl. 81—469 **10 Claims**



1. In an electrically operated device for turning nuts onto bolts, the device including a motor, a strain gauge coupled to the shaft of the motor for measuring torque delivered by the shaft, nut engaging means coupled to the shaft, and a power source for supplying electric power to the motor, the improvement comprising electronic analog control means for regulating power supplied to the motor in response to the output of the strain gauge, said electronic analog control means comprising:

first electronic comparator means coupled to the strain gauge for sensing a first predetermined output from the strain gauge, said first predetermined output from the stain gauge corresponding to a fraction of a desired torque;

second electronic comparator means coupled to the strain gauge for sensing a second predetermined output from the strain gauge, said second predetermined output from the stain gauge corresponding to the desired torque; and

electronic control circuitry coupled to the power source, said electronic control circuitry being coupled to said first and second electronic comparator means and responsive

thereto for providing a primary power input to the motor to achieve a first predetermined constant shaft velocity in response to said first electronic comparator means not sensing said first predetermined output from the strain gauge, a secondary power input to the motor to achieve a second predetermined constant shaft velocity less than said first predetermined constant shaft velocity in response to said first electronic comparator means sensing said first predetermined output from the strain gauge and for terminating power to the motor and applying a braking action to the motor in response to said second electronic comparator means sensing said second predetermined output from the strain gauge.

4,987,807

MULTISPINDLE LATHE

Avram B. Simon, London, Great Britain, assignor to Wickman Bennett Machine Tool Co. Ltd., England

Continuation of Ser. No. 214,749, Jul. 5, 1988, abandoned. This application Feb. 27, 1990, Ser. No. 489,763

Claims priority, application United Kingdom, Jul. 8, 1987, 8716099; Dec. 15, 1987, 8729235

Int. Cl.[5] B23Q *39/00*

U.S. Cl. 82—124 **8 Claims**

8. A multispindle lathe comprising, in combination:

(a) a rigid stationary frame having a first end and having a second end spaced from said first end so as to define a workspace between said first and second ends,

(b) a drum mounted for rotation on one of said ends of said frame,

(c) indexing means for indexing said drum relative to said frame about the axis of rotation of said drum,

(d) a plurality of driven main spindles carried by said drum and with said main spindles having axes of rotation disposed parallel to and spaced about said drum axis,

(e) each said main spindle being positioned to carry a workpiece within said workspace,

(f) a plurality of tool mechanisms carried by said frame and disposed about said drum axis for machining workpieces carried by said main spindles,

(g) said multispindle lathe further including a secondary spindle facing towards said main spindles and with said secondary spindle having an axis of rotation positioned parallel to said rotational axes of said main spindles,

(h) said secondary spindle being equipped to grip a portion of a workpiece protruding from one of said main spindles,

(i) a two-axis slide system carried by said frame and with said slide system supporting said secondary spindle so that said secondary spindle can be moved in directions axially towards and away from as well as transversely with respect to said axes of said main spindles,

(j) drive means for rotating said secondary spindle,

(k) a tool support for carrying one or more tools for machining a workpiece carried by said secondary spindle,

(l) said tool support being carried by the said one of said ends of said frame and being spaced from the said axis of said drum,

(m) and workpiece supply means carried by or associated with said frame of said lathe,

(n) said workpiece supply means comprising means for feeding workpieces directly to said secondary spindle so that a workpiece fed directly to said secondary spindle from said workpiece supply means can be subjected to machining by tools carried by said tool support at the same time that other workpieces carried by said main spindles are being machined by said tool mechanisms disposed about the axis of said drum.

4,987,808

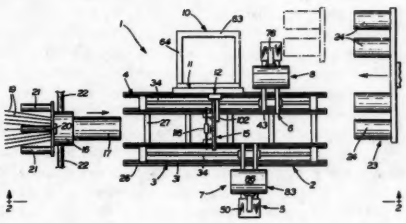
TUBULAR SLEEVE HANDLING AND CUT-OFF SYSTEM

Richard W. Sicka, Brecksville; Dale A. Tompkins, Akron, both of Ohio, and Peter Kündig, Männedorf, Switzerland, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Jun. 20, 1988, Ser. No. 208,715

Int. Cl.[5] B26D *1/60, 3/16, 30/00*

U.S. Cl. 83—13 **49 Claims**



1. A method for handling and cutting off a predetermined axial length sleeve of an elastomeric material from a generally tubular extrudate of said elastomeric material, said method includes the steps of:

(a) gripping and enveloping a leading section of the extrudate with first gripper means wherein said leading section has an axial length substantially equal to the predetermined length of sleeve to be cut from said extrudate;

(b) moving said leading section of the extrudate in a forward axial direction and applying an axial tension on said extrudate;

(c) gripping and enveloping a trailing section of the extrudate with second gripper means wherein said trailing section has an axial length generally equal to the axial length of the leading section;

(d) severing the leading section from the trailing section by severing the extrudate between the first and second gripping means as said extrudate and gripping means are moving in the forward direction and tension is being applied to the leading section by the first gripping means, whereby said leading section forms said predetermined axial length sleeve of said extrudate;

(e) continuing moving the severed sleeve by the first gripping means to a discharge station; and

(f) returning the first gripping means to a position trailing the second gripping means whereby said first gripping means is in a position to grip and envelop another trailing section of the extrudate as the second gripping means continues to move the extrudate in an axial forward direction and apply tension thereto prior to severing another of said sleeve from the extrudate.

4,987,809

PRODUCTION OF SMALL-SIZED PRINTED PRODUCTS

Freuerick F. Price, Chicago, Ill., assignor to The Wessel Company, Inc., Elk Grove Village, Ill.

Continuation of Ser. No. 328,329, Mar. 24, 1989, abandoned. This application Apr. 18, 1990, Ser. No. 512,542

Int. Cl.[5] B26H *35/04*

U.S. Cl. 83—27 **23 Claims**

1. A method for manufacturing small-sized, printed paper coupons for food packages, wherein each coupon has an upstream edge, a downstream edge and opposite side edges, said method comprising the steps of:

separating a continuous ribbon of said coupons into individual pieces;

discharging each individual piece initially in a straight-line alignment facing in a downstream direction toward a conveyor separated by a space from the location of said separating step;

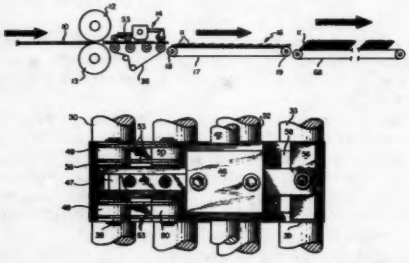
carrying each of said coupons in a downstream direction across said space toward said conveyor;

during said carrying step, exerting, against the top surface of said moving coupon, a downward force concentrated along a pair of lines, each extending longitudinally in said downstream direction, said pair of lines being spaced apart in a direction transverse to said downstream direction;

and, during said carrying step, engaging the bottom surface of said moving coupon along a contact area underlying each of said lines of force exerted against the top surface of said coupon and also underlying each of said opposite side edges of the coupon, with the distance between the outer limits of contact against the bottom surface, in said transverse direction, being greater than the distance between said spaced apart pair of lines.

8. In an apparatus for manufacturing printed paper coupons, wherein said apparatus comprises a rotary cutter for separating a continuous ribbon of said coupons into individual pieces, each having an upstream edge and a downstream edge and opposite side edges, and for discharging each individual piece initially in a straight-line alignment in a downstream direction, and a conveyor located downstream of said rotary cutter, the improvement which permits the use of said apparatus in the manufacture of small-sized coupons for food packages, said improvement comprising:

continuous belt means defining a continuous, uninterrupted bridge located between said rotary cutter and said conveyor;



said bridge having an upstream end facing toward said rotary cutter and a downstream end facing toward said conveyor;

said upstream end comprising means for receiving a small-sized coupon coming from the rotary cutter;

means for driving said belt means to carry said coupon in a downstream direction toward said conveyor;

and a first coupon-engaging means, located above said belt means, and cooperating with said belt means to maintain the speed of movement of said small-sized coupon, in a downstream direction, the same as the speed of the belt means;

said first coupon-engaging means comprising means for exerting, against the top surface of said coupon, a downward force concentrated along a pair of lines, each extending longitudinally in said downstream direction, said pair of lines being spaced apart in a direction transverse to said downstream direction;

said belt means comprising means for engaging the bottom surface of said coupon along a contact area underlying each of said lines of force exerted against the top surface of said coupon and also underlying each of said opposite side edges of the coupon, the distance between the outer limits of contact against the bottom surface, in said transverse direction, being greater than the distance between said spaced apart pair of lines.

4,987,810

EDGE SHARPENING

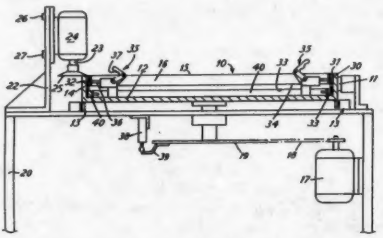
Melvyn J. W. Stevens, Longfield, England, assignor to Augustus Martin Limited, London, England

Filed Mar. 30, 1988, Ser. No. 175,143

Claims priority, application United Kingdom, Mar. 31, 1987, 8707684

Int. Cl.[5] B26D *1/47, 7/04*

U.S. Cl. 83—176 **11 Claims**



1. A strip blade edge sharpening machine for edge sharpening a strip providing a doctor blade or a squeegee blade, wherein said machine comprises:

(a) a cylindrical member having an internal cylindrical abutment surface,

(b) means to hold the strip with a major face thereof against said internal cylindrical abutment surface and with a minor face thereof disposed longitudinally beyond one end of said cylindrical abutment surface of said member, said holding means comprising a split ring member for engaging the opposite major face of the strip to sandwich the strip between the split ring member and said cylindrical abutment surface,

(c) means to rotate said member about the axis of said cylindrical abutment surface,

(d) a rotary cutting blade, and

(e) means to effect relative movement between said blade and the strip in a direction longitudinally of the strip such that said blade cuts through the strip between the opposite major faces, at a location between said minor face and said one end of said cylindrical surface.

4,987,811

ELECTRIC PUNCH

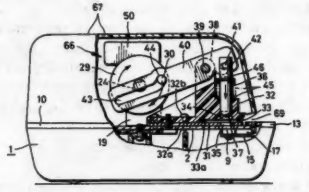
Masayoshi Ikarashi, Niigata, and Kunihati Okazaki, Abiko, both of Japan, assignors to Maruzen Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1989, Ser. No. 453,870

Claims priority, application Japan, Mar. 2, 1989, 1-50439

Int. Cl.[5] B26D *5/16, 5/38*

U.S. Cl. 83—372 **8 Claims**



4. An electric punch comprising:

a base plate;

at least first and second punching holes associated with said base plate;

at least first and second punching blocks;

means for guiding said at least first and second punching blocks vertically into said first and second punching holes;

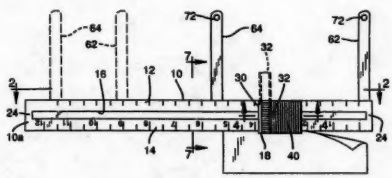
a first operation arm;
first means for rotatably connecting said first operation arm to said first punching block;
a first supporting shaft hingeably supporting said first operation arm;
a first guide groove in said first operation arm;
a first operation pin engaging said first guide groove;
first rotary means for driving said first operation pin about an axis, whereby said first operation arm is rotated about said first supporting shaft, and said first punching block is moved in a vertical direction with respect to said first punching hole;
a second operation arm;
second means for rotatably connecting said second operation arm to said second punching block;
a second supporting shaft hingeably supporting said second operation arm;
a second guide groove in said second operation arm;
a second operation pin engaging said second guide groove;
second rotary means for driving said second operation pin about an axis, whereby said second operation arm is rotated about said second supporting shaft, and said second punching block is moved in a vertical direction with respect to said second punching hole;
means for concertedly driving said first and second rotary means for driving;
said means for concertedly driving including means for disposing said first and second operation pins at rotational positions that are mutually asymmetrical;
means for producing a second length stroke of said second punching block that is different from a first length of stroke of said first punching block, whereby said first and second length strokes are completed at staggered times;
a guide concavity in said second guide groove;
said guide concavity being disposed at a position along said second guide groove coinciding with a position of said second operation pin during a quiescent condition of said electric punch, said guide concavity being effective for producing said second length of stroke of said second punching block; and
resilient means for urging said second guide block in a direction tending to move said second operation pin into said guide concavity.

4,987,812

COMBINATION RULER AND CUTTER GUIDE

Cande Benavidez, P.O. Box 282, Woodburn, Oreg. 97071

Filed Nov. 3, 1989, Ser. No. 431,446
Int. Cl.[5] B26D *7/02*
U.S. Cl. 83—455 **5 Claims**



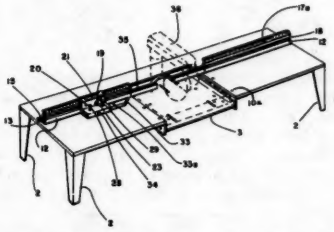
1. A combination ruler and cutter guide comprising:
a flat, elongated body member having top and bottom surfaces and end and outer defining side edges;
indicia markings on the top surface of said body member adjacent at least one of said outer defining edges;
longitudinal slot means in said body member;
a cutter member slidably guided in said slot means;
said cutter member including forward, rearward and side portions;
one of said side portions of said cutter member having a depending flange with a vertical surface parallel with said one of said outer defining side edges of said body member,
said rearward portion having upper and lower positions with said upper position comprising a biased rest position,
and an upright cutter blade having a bottom cutting edge,
said cutter blade being mounted on said vertical surface of said flange in depending relation closely adjacent the said one of said outer defining side edges of said body member,
said rearward portion of said cutter member and said cutter blade being dimensioned and arranged such that the cutting edge of said cutter blade is disposed above the bottom surface of the body member in the upper rest position of said rearward portion and projects below the bottom surface face of said body member in a cutting position in the lower position of said rearward portion.

4,987,813

APPARATUS FOR INSTALLATION OF A POWER SAW AND FENCE IN A TABLE

John P. Viazanko, 15034 Chase St., Sepulveda, Calif. 91343

Filed Jan. 9, 1990, Ser. No. 462,597
Int. Cl.[5] B27B *15/18;* **B27C** *9/00*
U.S. Cl. 83—471.3 **23 Claims**



1. Apparatus for installing a power saw having a base and a work support with a horizontal upper surface in a table having a top with a continuous upper working surface, and a cut-out to receive said work support, said cut-out leaving said top with portions at each side and a connecting portion therebetween, comprising mounting means attached to said top to support said base, the dimensions and placement of said means being such that the saw work support is held within said cut-out, and the upper surface of said saw work support and the upper surface of said table are substantially co-planar to present a composite work supporting surface for said saw, comprising both of said first named surfaces, said top being of sufficient strength and rigidity to support said saw and the work being sawed under normal conditions.

4,987,814

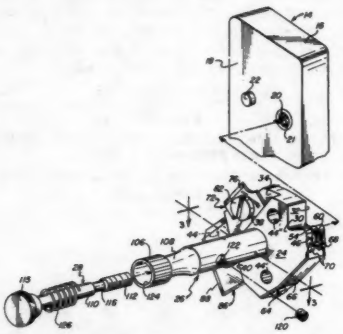
TURRET ASSEMBLY FOR CUTTING MACHINE HEAD

Vincent T. Kozyrski, Plainville, and Alan R. Peters, Milford, both of Conn., assignors to The Fletcher-Terry Company, Farmington, Conn.

Filed Jul. 8, 1988, Ser. No. 216,767
Int. Cl.[5] C03B *33/07, 33/10;* **B26D** *3/08*
U.S. Cl. 83—884 **19 Claims**

1. A turret assembly for a multipurpose cutting head, comprising: a generally planar turret body portion having opposite side faces, a central aperture, a plurality of peripheral stations adapted for mounting separate cutting members thereon, and a corresponding plurality of detent elements operatively disposed on one of said faces, one of said detent elements being associated with each of said stations; an elongated sleeve portion extending from the opposite face of said body portion and attached thereto, said sleeve portion extending normal to the plane of said body portion, having a bore therethrough aligned with said aperture thereof, and having a free end with an adjacent section that can be manually gripped; a mounting bolt, including a shaft slidably and rotatably received in said bore and aperture, said shaft having a head portion and a

threaded portion at the opposite ends thereof, lying outwardly of and adjacent to said free end of said sleeve portion and of said one face of said body portion, respectively; and means for biasing said mounting bolt away from said body portion, whereby said assembly can be firmly affixed to a supporting part of a cutting head having means for threadably engaging said threaded portion of said shaft and for cooperatively engaging said detent elements, with said assembly clamped thereto by tightening of said bolt to bring said head portion thereof against said free end of said sleeve portion, and can, with said head portion displaced from said free end of said sleeve portion, be indexed manually, by use of said sleeve portion, to each of a plurality of positions thereon in which said peripheral stations are selectively operatively oriented.



4,987,815

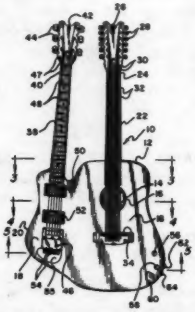
ACOUSTIC AND ELECTRIC COMBINATION GUITAR

Gary Shockley, 9 Dartmouth Dr., Atco, N.J. 08004, assignor to Gary Shockley, Atco, N.J.

Filed Jul. 25, 1988, Ser. No. 223,953

Int. Cl.[5] G10D *1/08*; G10H *1/32*

U.S. Cl. 84—291 **7 Claims**



1. An acoustic and electric combination guitar comprising;

(a) a single, integral body with both hollow and solid characteristics,

(b) said body having an acoustic guitar hollow portion and an electric guitar solid portion,

(c) a first neck having one end attached to the hollow portion and a free terminal end,

(d) a first head attached to the terminal end of the first neck,

(e) a first set of strings strung over an aperture and supported between a first set of tuners located on the first head and a bridge attached to the top panel of the acoustic guitar hollow portion,

(f) the electric guitar solid portion of the body having a top surface facing in the same direction as the top panel, and

(g) a second neck attached to and extending from the solid portion of the body in substantially the same direction as the first neck wherein said second neck has one end attached to the solid portion of the body and a free terminal end,

(h) a second head attached to said terminal end of the second neck,

(i) a second set of strings strung over electric pickups and supported between a second set of turners located on the second head and a second bridge attached to the top surface,

wherein the electric pickups pick up sound signals from the second set of strings and transmit the sound signals to an amplifier.

4,987,816

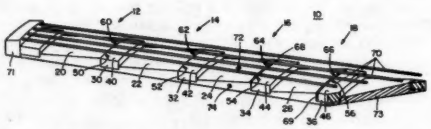
FINGERBOARD

Lane Poor, Warren, R.I., assignor to The Sound Music Co., Inc., Fall River, Mass.

Filed Aug. 28, 1989, Ser. No. 399,156

Int. Cl.[5] G10D *3/06*

U.S. Cl. 84—314 R **17 Claims**



1. A fingerboard for a stringed instrument, comprising:

a plurality of fingerboard sections each including a fret block having a hardness in the range of 88 Shore D or higher and made of silica and carbon bearing epoxy, each fret block having a raised surface substantially parallel to the fingerboard, and a fret edge; and

recessed surfaces at least partially inclined to verge upon said fret edges.

4,987,817

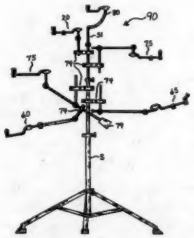
MUSICAL CYMBAL SUPPORT AND REVOLVER ACCESSORIES

Gilberto B. Diaz, P.O. Box 3287, Taos, N. Mex. 87571

Filed Jul. 24, 1989, Ser. No. 383,450

Int. Cl.[5] G10D *13/02*

U.S. Cl. 84—421 **8 Claims**



4. A musical cymbal support and revolver accessory, the combination comprising:

an elongate rotatable arm means member of sufficient predetermined length for the accomodation of different cymbal sizes comprising a first end and a cymbal support fixed post member support portion, said cymbal support fixed post member support portion is secured to said first end and comprises a flat surfaced portion consisting of a top

part and a bottom part sustaining a round aperture through said flat surfaced portion said cymbal support fixed post member support portion supports a cymbal support fixed post member secured in said aperture thereby affixing said cymbal support fixed post member to said top part of said cymbal support fixed post member support portion of said elongate rotatable arm means member, said elongate rotatable arm means member further including a second end off-set and opposed to of said first end and said cymbal support fixed post member support portion, said second end portion includes a segment which is rotatably mounted and journaled within a support means member about a common axis off-set from the longitudinal axis of said elongate rotatable arm means member to define an axis of revolution about which said elongate rotatable arm means member may revolve,

said cymbal support fixed post member comprising a fixed post member suitably dimentioned and threaded over a substantial portion of its length for receiving and securing a cymbal thereto, said fixed post member is fixed in the sence that it is unadjustable, said fixed post member terminates with a portion that mates with said aperture of said cymbal support fixed post member support portion of said elongate rotatable arm means member, said cymbal support fixed post member allows a cymbal to be selectively positioned at an angle or tile thereto relative to the length of said fixed post member, center of gravity of said cymbal and the longitudinal axis of said elongate rotatable arm means member whereby said cymbal's angle of repose or tilt may be selected prior to impact a,

a support means member having a cylindrically shaped core comprising an exterior wall and interior wall, said walls defining a hollow interior space with openings on both sides of said support means member, said interior space defines a central round aperture which passes from one end of said support means member to the other end of said support means member, said round aperture being parallel to said walls, said hollow interior space and said interior wall firmly hold and support one, or more bearings; said bearings rotatably mount and permit said opposed off-set end portion of said elongate rotatable arm means member to be journaled thereto within of said bearings so as to define said axis of revolution common to said opposed off-set end portion and about which said cymbal and the longitudinal of said elongate rotatable arm means member may revolve after impact a,

a primary tubular mounting arm member of sufficient length suitably connected to, said support means member, said primary tubular mounting arm member is positioned parallel to said support means member and perpendicular to the longitudinal axis of said elongate rotatable arm means member, said primary tubular mounting arm member further comprises a means for connecting said accessory to a suitable support structure.

4,987,818

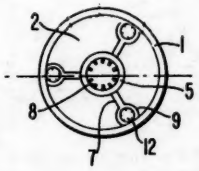
SHAPING APPARATUS FOR AN EXPLOSIVE CHARGE

Sidney C. Alford, 41A Pickwick, Corsham, Wiltshire, England SN13 0HX

Filed May 23, 1989, Ser. No. 355,607

Int. Cl.[5] C06B *21/00*; F42B *4/00, 1/00, 1/02*

U.S. Cl. 86—1.1 **13 Claims**



1. Shaping apparatus for an explosive charge, the shaping apparatus comprising a hollow cylindrical body open at each end, a frusto-conical integrally formed partition at an intermediate position within said body for shaping an explosive charge inserted into the body from one end thereof on a concave side of said partition, sleeve means on the convex side of and integral with said partition for supporting a tubular detonator, said sleeve means extending coaxially within said body from an apex of said frusto-conical partition, and radially extending support members between said body and said sleeve means for supporting said sleeve means within said body.

4,987,819

FLAIL SYSTEM FOR A TERRAIN CLEARANCE SYSTEM

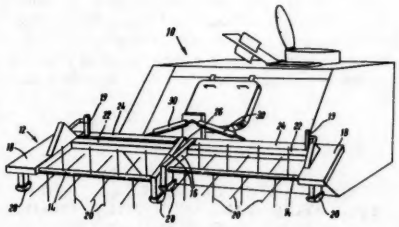
Stephen Brown, Burwell, Great Britain, assignor to Aardvark Clear Mine Limited, Aberdeenshire, Scotland

Filed Oct. 17, 1989, Ser. No. 422,586

Claims priority, application United Kingdom, Oct. 18, 1988, 8824314

Int. Cl.[5] F41H *11/12*

U.S. Cl. 89—1.13 **9 Claims**



1. A flail system for a terrain clearing system, the flail system comprising at least two flail axles each extending laterally on a respective side of the longitudinal axis of the flail system, each flail axle carrying a respective axially-distributed array of flail chains, mounting means for rotatably mounting each of each flail axle at a controllable height above terrain, said mounting means being such that the flail axles can be held either substantially parallel to terrain in a terrain-clearing configuration of the flail system or folded upwardly into an inactive configuration of the flail system having an overall width which is substantially less than the overall width of the flail system when in the terrain-clearing configuration.

4,987,820

ARMING UNIT

Francis R. Gordon, Berkshire, England, assignor to M. L. Aviation Company Ltd., Berkshire, England

Filed Dec. 7, 1988, Ser. No. 288,710

Claims priority, application United Kingdom, Dec. 18, 1987, 87-29593

Int. Cl.[5] B64D *1/04*

U.S. Cl. 89—1.55 **7 Claims**

1. An arming unit for use on an aircraft to control the arming of a store containing explosive on its release from said aircraft, comprising:

a hook for engaging and retaining a loop on an end of an arming wire attached to an arming pin on said store;

a pivot pivotally mounting said hook;

means biassing said hook into a closed position;

a spring loaded plunger;

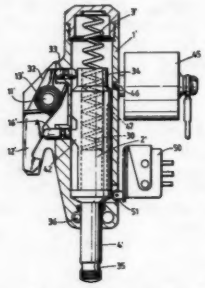
an extended portion of said spring loaded plunger constituting a sensor for engaging an upper surface of said store to be released;

an inter-connection means, located between said hook and said spring loaded plunger, for opening said hook as a result of downward movement of said plunger on release of said store; and,

a lock, said lock comprising lock means for holding said

hook in a closed position and thereby preventing operation of said inter-connection,

whereby in use, when a safe, unarmed release is required, said lock is not operated and said inter-connection opens



said hook to release said loop without restraint, but if armed release is required, said lock is operated and prevents said inter-connection from opening said hook so that the loop is not released and said store is armed by said arming wire as said store falls away from said aircraft.

4,987,821

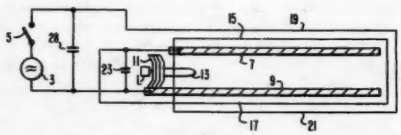
ELECTROMAGNETIC PROJECTILE LAUNCHER WITH ENERGY RECOVERING AUGMENTING FIELD AND MINIMAL EXTERNAL FIELD

George A. Kemeny, Wilkins Twp., and Fred J. Baehr, Jr., Export, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 23, 1981, Ser. No. 256,745

Int. Cl.[5] F41F *1/00, 1/01, 7/00*

U.S. Cl. 89—8 **32 Claims**



1. An electromagnetic projectile launcher comprising:

a first pair of conductors having a breech end and a muzzle end;

means for conducting current between said first pair of conductors and for propelling a projectile from the breech to the muzzle end of said first pair of conductors;

a second pair of conductors electrically connected to said first pair of conductors and respectively disposed alongside said first pair of conductors so that the current in adjacent conductors of each pair flows in the same direction and so that the magnetic flux produced by the current in the adjacent conductors of the first and second pairs is substantially linked;

a source of high current connected to said conductors for supplying high current thereto;

switching means disposed between said first pair of conductors adjacent the breech end thereof;

said switching means being operable to open to allow high current to flow to said current conducting and projectile propelling means to launch said projectile and to close when said current conducting and projectile propelling means is in the vicinity of the muzzle end of said first pair of conductors.

4,987,822

LINEAR ACTUATOR

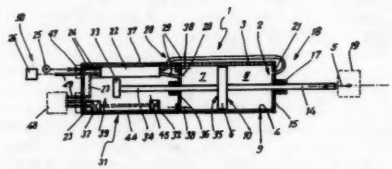
Kurt Stoll, Esslingen, Fed. Rep. of Germany, assignor to Festo KG, Esslingen, Fed. Rep. of Germany

Filed Aug. 2, 1989, Ser. No. 389,004

Claims priority, application European Pat. Off., Aug. 18, 1988, 88113407.6

Int. Cl.[5] F16D *33/06*

U.S. Cl. 91—358 R **11 Claims**



1. A linear actuator, comprising: a linear motor having a motor housing which has a working end and a control end and which contains an axially movable piston coupled to an actuating rod extending out of said motor housing at said working end thereof; a control device which controls operation of said motor; and sensor means for sensing the position of said actuating rod, said sensor means including at least one sensor; wherein said linear motor, said control device and said sensor are connected to each other to form a readily handled working unit, and said control device and said sensor are locate don a side of said control end of said linear motor remote from said working end; wherein said sensor means includes an operating rod coaxial to said actuating rod and coupled to said piston on a side thereof opposite from said actuating rod, said operating rod extending out of said motor housing at said control end thereof and having on a portion disposed outside said motor housing at lest one switching part, said sensor being positionally adjustable in the direction of motion of said operating rod and being responsive to the position of said switching part, wherein said control device and said sensor are arranged transversely side by side in relation to the longitudinal direction of said actuator and are spaced sufficiently to allow said operating rod to extend therebetween.

4,987,823

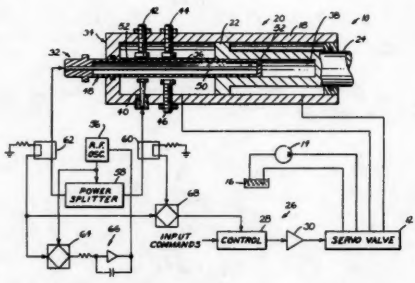
LOCATION OF PISTON POSITION USING RADIO FREQUENCY WAVES

Lael B. Taplin, Union Lake, and Calman S. Sagady, West Bloomfield, both of Mich., assignors to Vickers, Incorporated, Troy, Mich.

Filed Jul. 10, 1989, Ser. No. 377,051

Int. Cl.[5] F15B *13/16*

U.S. Cl. 91—361 **29 Claims**



22. A system for monitoring position of a piston within a cylinder that comprises:

a coaxial transmission line, including an outer conductor

formed by said cylinder and a center conductor operatively coupled to said piston such that length of said coaxial transmission line is determined directly by position of said piston within said cylinder,

means for launching rf energy within said coaxial transmission line, said energy-launching means including an rf generator and a stub antenna coupled to said generator and extending radially into said cylinder for capacitively coupling rf energy from said generator to said center conductor, and

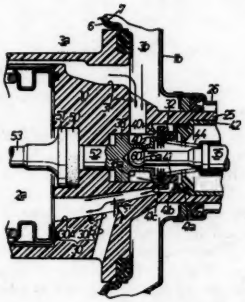
means responsive to rf energy reflected by said coaxial transmission line for indicating position of said piston within said cylinder.

4,987,824

TANDEM-TYPE VACUUM BOOSTER WITH NOISE SUPPRESSING AIR PASSAGE

Takayoshi Shinohara; Kiyotaka Kobayashi, and Yoshiharu Nagafuji, all of Ueda, Japan, assignors to Nissin Kogyo Kabushiki Kaisha, Ueda, Japan

Filed Feb. 16, 1989, Ser. No. 311,245
Claims priority, application Japan, Feb. 17, 1988, 63-19438[U]
Int. Cl.[5] F15B *9/10*
U.S. Cl. 91—369.1 **3 Claims**



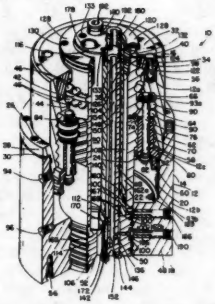
1. A tandem-type vacuum booster comprising a partition plate fixedly mounted in a booster shell for partitioning the interior of said booster shell into a front shell chamber and a rear shell chamber; a front booster piston dividing said front shell chamber into a front-side fore vacuum chamber connected to a vacuum pressure source and a rear-side fore operating chamber; a rear booster piston dividing said rear shell chamber into a front side hind vacuum chamber and a rear-side hind operating chamber, said both booster pistons being interconnected through a piston boss slidably carried on said partition plate and connected to an output rod; a valve tube integrally connected to said piston boss to project from a rear end of said piston boss and slidably supported on a rear wall of said booster shell; a first passage interconnecting an interior of said valve tube with both said vacuum chambers; a second passage interconnecting said interior of said valve tube with both said operating chambers, said first passage including an axial passage interconnecting said fore vacuum chamber and said interior of said valve tube and a radial passage interconnecting said axial passage and said hind vacuum chamber; an input rod movable back and forth within said valve tube; and a control valve connected to said input rod for selectively interconnecting said second passage with said first passage and with an atmosphere source depending upon the backward and forward movements of said input rod, said input rod and said control valve being disposed within said valve tube, said axial passage having a radial inner side wall which extends substantially straightforwardly and a radial outer side wall, a portion of said axial passage, closer to said fore vacuum chamber and between said fore vacuum chamber and said radial passage being larger in diameter than a portion of said axial passage connected to said interior of said valve tube and being offset on the side of said radially outer side wall in a radially outward direction from said axial passage portion connected to the interior of the valve tube to form a step between said axial passage portions.

4,987,825

ACTUATOR WITH FLUID TRANSFER TUBES

Paul P. Weyer, 48811 284th S.E., Enumclaw, Wash. 98022

Filed Jun. 23, 1989, Ser. No. 370,640
Int. Cl.[5] F01B *21/00*
U.S. Cl. 92—2 **9 Claims**



9. A fluid-powered actuator for selectively rotating and linearly moving a fluid-powered external device with at least one fluid port to communicate pressurized fluid thereto for the operation of the external device, comprising:

an outer body having a forward end and a rearward end and a body chamber axially extending therebetween within said body;

a first member extending generally coaxially within said body chamber and supported for rotational movement relative to said body, said first member having a forward end toward said body forward end and a rearward end with a rearward wall toward said body rearward end, said rearward wall having a plurality of recesses opening at a face thereof toward said first member rearward end to and fully through a face thereof toward said first member forward end, said first member further having a chamber extending longitudinally and generally axially through said first member from said rearward wall fully through to said first member forward end to define a chamber end opening at said first member forward end;

a pair of first fluid ports;

first means for producing rotational movement of said first member relative to said body in response to the application of fluid pressure to one or the other of said first fluid ports;

a second member extending generally longitudinally within said first member chamber and supported for axial movement relative to said first member, said second member projecting forwardly beyond said chamber end opening, and having a forward end and a rearward end with a plurality of apertures extending generally axially through said second member from said second member rearward end to a position toward said second member forward end, said second member apertures including a piston aperture, and at least one device drive aperture extending fully through to said second member forward end to define an end opening at said second member forward end, said second member apertures being in generally axial alignment with said first member recesses in said rearward wall;

a piston mounted for reciprocal axial movement within said first member chamber in response to the application of fluid pressure to one or the other opposing axial sides thereof, said piston operatively engaging said second

member to produce axial movement of said second member relative to said first member, said piston drive aperture being in fluid communication with said axial side of said piston toward said body forward end;

a pair of second fluid ports to selectively communicate pressurized fluid to said opposing axial sides of said piston;

means for attachment of the external device to said second member at said second member forward end with the external device fluid port in fluid communication with said end opening of said device drive aperture;

a plurality of elongated fluid conductors having a rearward end portion positioned in said first member recess and a forward end portion extending forward of said rearward wall into said second member apertures a sufficient axial distance to maintain said conductors positioned at least partially within said second member apertures as said second member axially reciprocates within said first member chamber between an end limit of travel toward said body forward end and an end limit of travel toward said body rearward end, said second member being axially movable relative to said conductor forward end portions for reciprocal axial movement relative to said first member, each of said conductors having a longitudinally extending interior fluid conduit for communicating pressurized fluid between a rearward end portion of said conduit at said conductor rearward end portion and a forward end portion of said conduit at said conductor forward end portion, with said conduit forward end portion positioned to remain in fluid communication with the one of said second member apertures in which said conductor extends during the entire axial travel of said second member between said end limits of travel, said conduit rearward end portion of the one of said conductors extending into said piston drive apertures being in fluid communication with one of said pair of second fluid ports, to thereby communicate pressurized fluid to said axial side of said piston toward said body forward end;

seal means for providing a fluid-tight seal between said conductor forward end portions at a location intermediate said conduit forward and rearward end portions, and said second member apertures in which said conductors extend;

means for restraining said second member against rotational movement relative to said first member while permitting axial movement of said second member relative to said first member; and

at least one third fluid port to selectively communicate pressurized fluid to said conduit rearward end portion of the one of said conductors extending into said device drive aperture with said end opening, to thereby communicate pressurized fluid to the external device fluid port, whereby the external device can be selectively, rotationally moved relative to said body by selected rotation of said first member, and selectively, linearly moved relative to said body by selected axial movement of said second member relative to said first member, and the external device, at the various positions to which moved, can be selectively and remotely operated under fluid-power by the selected application of pressurized fluid to said third fluid port.

4,987,826

CYLINDER PISTON ROD UNIT

Norbert Deppert, Gochsheim, and Helmut Umlauf, Schweinfurt, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

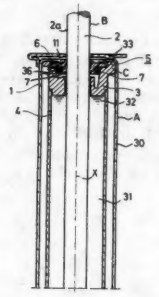
Filed Sep. 7, 1989, Ser. No. 404,120

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831719

Int. Cl.[5] F16J *15/18*

U.S. Cl. 92—168 **24 Claims**

1. A cylinder piston rod unit comprising a cylinder member (4) having an axis (X) and two ends, a piston rod guiding and sealing unit (C) adjacent at least one of said two ends and a piston rod member (2) axially extending through said piston rod guiding and sealing unit (C), said piston rod guiding and sealing unit (C) comprising at least one sealing ring member (5), said sealing ring member (5) being axially fastened with respect to said one end of said cylinder member (4), said sealing ring member (5) having a substantially axially extending sealing sleeve portion(7) of elastomeric material surrounding said piston rod member (2), said sealing sleeve portion (7) having a radially inner sealing face (7*a*) sealingly engaging an external cylindrical face (2*a*) of said piston rod member (2), a closed sealing pressure application ring (11) being mounted on said



sealing sleeve portion (7) radially outwards of said radially inner sealing face (7*a*), said sealing pressure application ring (11) being free for radial movement, said sealing pressure application ring (11) being subject to a circumferential tensional force at least in the lower part of a range of operational temperatures of said sealing sleeve portion (7), said circumferential tensional force maintaining a radial sealing pressure between said radially inner sealing face (7*a*) of said sealing sleeve portion (7) and said external cylindrical face (2*a*) of said piston rod member (2), said sealing pressure application ring (11) being substantially non-extensible by said circumferential tensional force.

4,987,827

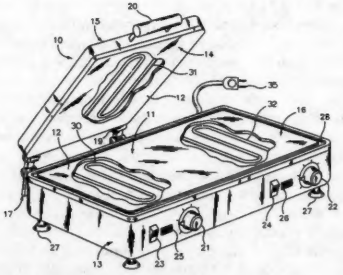
COOKING APPARATUS

Mariaelena S. Marquez, 4231 Serena Ave., Oceanside, Calif. 92056

Filed Mar. 19, 1990, Ser. No. 495,392

Int. Cl.[5] A47J *37/00*

U.S. Cl. 99—331 **5 Claims**



1. A cooking apparatus comprising:

a. a first lower heating surface in a lower housing;

b. an upper heating surface in an upper housing;

c. a second lower heating surface in the lower housing;

d. an adjustable hinge means hingingly connecting the lower and upper housing;

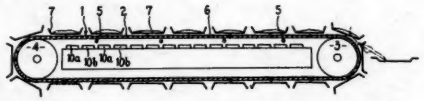
e. a tension means to bias the upper heating surface in an open position relative to a closed position closely adjacent the first lower heating surface;
e. a first heating means to heat the first lower heating surface;
f. a second heating means to heat the upper heating surface;
g. a third heating means to heat the second lower heating surface;
h. a first temperature control means in the lower housing to control the temperature of the first lower and the upper heating means;
i. a second temperature control means in the lower housing to control the temperature of the second lower heating means;
j. a power cord to plug into a power source;
k. a first switch in the lower housing to interrupt power to the first lower and the upper heating means;
l. a second switch in the lower housing to interrupt power to the second lower heating means;
m. a first indicator light in the lower housing to indicate power to the first lower and the upper heating means;
n. a second indicator light in the lower housing to indicate power to the second lower heating means; and
o. a handle on the upper housing to position the upper heating surface in the closely adjacent position relative to the first lower heating surface.

4,987,828

INDUCTIVE HEATING APPARATUS FOR COOKING THIN DISHES SUCH AS OMELETS, QUICHES OR THE LIKE

Jacques Nuns, and Alain Girault, both of Moret S/Loing, France, assignors to Electricite de France - Service National, Paris, France

Filed Nov. 30, 1988, Ser. No. 277,818
Claims priority, application France, Dec. 2, 1987, 87 16655
Int. Cl.[5] A23L *3/00*
U.S. Cl. 99—443 C **6 Claims**



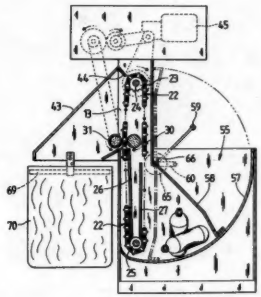
1. An apparatus for cooking thin dishes such as omelets, quiches or the like, comprising an endless conveyor having an upper reach movable in a given direction and a lower reach, substantially round receptacles adapted to receive separate portions of said dish and mounted at even distances apart on said upper reach of the conveyor, and inductive heating means for heating said receptacles, said heating means comprising a plurality of spiral electric inductors having a generally circular shape disposed below said upper each of said conveyor, each of said inductors having a diameter approximately equal to one-half of the diameter of the receptacles and being disposed in two staggered rows extending, in said given direction of movement of said upper reach of the conveyor, symmetrically relative to an axis of movement of the receptacles, wherein said axis of movement is horizontal, and wherein adjacent inductors in said two rows extend in respectively opposite directions horizontally through a central vertical plane of said conveyor whereby said adjacent inductors are staggered and overlap with respect to said vertical plane, and wherein said adjacent inductors are interconnected such that electric current flows through them in respectively opposite directions, so as to ensure a homogeneous heating of said receptacles.

4,987,829

PERFORATOR/CRUSHER FOR PLASTIC BOTTLES

Wilbur G. Hudson, Columbus; Ronald F. Schley, Hamilton, and Joseph Tehrani, Columbus, all of Ga., assignors to Lummus Development Corp., Columbus, Ga.

Filed Sep. 29, 1989, Ser. No. 414,772
Int. Cl.[5] B30B *15/30, 5/04*
U.S. Cl. 100—45 **18 Claims**



1. Apparatus for reducing resilient containers, such as plastic bottles, for recycling and the like comprising:
(a) an elongated chain conveyor having a plurality of wedge-shaped teeth thereon for perforating and engaging resilient containers;
(b) a compression plate mounted adjacent said chain conveyor in converging relation thereto defining a vertical wall;
(c) means for compressing said containers subsequent to compression between said compression plate and said chain conveyor, wherein said compression means is characterized by an idler roller mounted at a fixed position relative to said chain conveyor and transversely thereto, within the rotation thereof and urging said chain conveyor toward said compression plate; and a driven roller mounted parallel to and proximal said idler roller with said chain conveyor passing between said idler roller and said driven roller; and means for selectively positioning said rollers to vary the space therebetween; and
(d) means for urging a predetermined volume of resilient containers toward said chain conveyor.

4,987,830

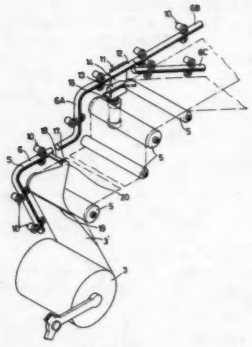
PAPER FEED DEVICE FOR ROTARY PRESS

Akira Fukuda, Osaka, and Itsuro Masuda, Higashiosaka, both of Japan, assignors to Hamada Printing Co., Ltd., Osaka, Japan

Filed Nov. 7, 1989, Ser. No. 432,872
Int. Cl.[5] B41F *13/02*
U.S. Cl. 101—228 **4 Claims**

1. A paper feed device of a rotary press, said device comprising a plurality of guide rails connected together so as to extend along different paper feed paths, a linear member adapted to move along said guide rails, a lever having one end thereof secured to one side of said linear member and provided at the other end thereof with means for detachably engaging a paper coupling adaptor capable of being coupled to the leading end of a roll of paper, and driving means for driving said linear member along said guide rails, said driving means comprising a plurality of pairs of rollers rotatably supported in the device at fixed predetermined intervals along said guide rails, and a motor operatively connected to one roller of each of said pairs of rollers to drive said one roller, said linear member having a

length slightly larger than the interval between adjacent pairs of said rollers such that said pairs of rollers successively engage



said linear member to feed said linear member along said guide rails.

4,987,831

INKING DEVICE, THE INK COAT OF WHICH IS CONTROLLABLE

Kurt Weder, Muri, Switzerland, assignor to Concepta Print AG, Gümligen, Switzerland

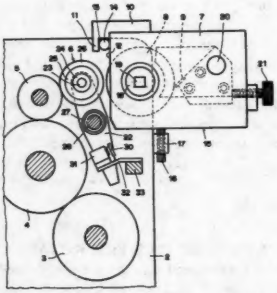
PCT No. PCT/CH88/00053, § 371 Date Nov. 2, 1988, § 102(e) Date Nov. 2, 1988, PCT Pub. No. WO88/06523, PCT Pub. Date Sep. 7, 1988

PCT Filed Mar. 3, 1988, Ser. No. 286,955

Claims priority, application Switzerland, Mar. 3, 1987, 794/87

Int. Cl.[5] B41F *31/04, 31/10, 31/38*

U.S. Cl. 101—350 **3 Claims**



1. An inking device for controllable and interchangeable inking comprising:

an ink densimeter **(37)** measuring and adjusting ink-density values of a printed sheet;

a controller **(36)** storing the measured ink-density values;

an interface **(38)** operatively connecting the ink densimeter to the controller;

a brayer roller **(5)** rotatably mounted in the inking device;

an inking roller **(8)** drivably mounted in an inkwell unit;

a lifter roller **(6)** comprising a plurality of roller sections **(6', 6'')**, each roller section being independently moveable transversely in a longitudinal direction between the inking roller and the brayer roller;

a plurality of actuation means **(30, 31)** each associated with a corresponding roller section for actuating the roller sections into reciprocative engagement between the brayer roller and the inking roller;

means **(44)** operatively connected to the actuation means for causing the controller to actuate each of the actuation means individually for a period of time determined as a function of said ink-density values measured on the printed sheet; and

the inkwell unit selectively removable from the remainder of the inking device, the inkwell unit having an angle piece **(10)** extending from the top of the inkwell unit, the angle piece having a downwardly facing groove **(13)** sized to receive therein a corresponding support rod **(14)** attached to the remainder of the inking device so that the inkwell unit is supported by and detachable from the remainder of the inking device, the inkwell unit comprising an inkwell holding ink and a doctor blade mounted in the inkwell and engaging the inking roller and regulating the amount of ink taken by the inking roller from the inkwell, the inking roller being mounted in the inkwell unit such that the inkwell unit surrounds the doctor blade and the inking roller and the inkwell unit is interchangeable as a complete unit when changing ink.

4,987,832

METHOD AND APPARATUS FOR INCREASING THE EFFECTIVENESS OF PROJECTILES

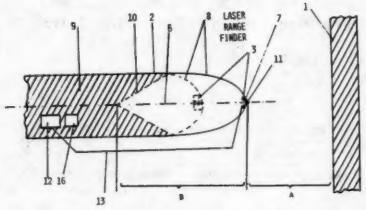
Paul Klink, Wiesenbach; Gunter Wichmann, Leimen, and Gerhard Dahm, Hohr-Grenzhausen, all of Fed. Rep. of Germany, assignors to Eltro GmbH, Fed. Rep. of Germany

Filed Apr. 22, 1983, Ser. No. 487,578

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1982, 3215845

Int. Cl.[5] F42C *13/02*

U.S. Cl. 102—213 **23 Claims**



1. An apparatus for optimizing the destructive effect of a projectile equipped with shaped charges, fragmentation ammunition or the like, comprising:

(a) laser means mounted on the tip of the projectile for emitting signal pulses;

(b) sensor means mounted at said tip for receiving pulses;

(c) a transmitting unit coupled to said laser means;

(d) a receiving unit coupled to said sensor means, said receiving unit cooperating with said transmitting unit to operate as a laser range finder to determine movement information in accordance with a sampling principle and comprising means for the generation of a low frequency representation of said signal pulses by sampling at a relatively high frequency;

(e) means for supporting said receiving and transmitting units, at positions displaced from the longitudinal axis of the projectile and positioned on opposite sides of said axis to define a passage therebetween;

(f) a charge being positioned within said passage along said longitudinal axis; and

(g) detonation means responsive to said receiving and sending units to actuate said charge.

4,987,833

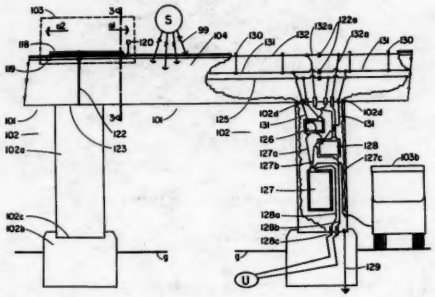
SOLAR INDUCTION MONORAIL APPARATUS AND METHOD

Mark J. Antosh, 4009 N. Stone Ave., Tucson, Ariz. 85705

Division of Ser. No. 174,422, Mar. 28, 1988, Pat. No. 4,885,995. This application Dec. 7, 1989, Ser. No. 447,237

Int. Cl.[5] B60K *16/00;* **E01B** *25/08*

U.S. Cl. 104—118 **9 Claims**



1. A solar energy collecting monorail structure apparatus, said monorail structure apparatus comprising:

(a) a solar collector monorail structure member supporting a vehicle, said monorail structure member having an outer protective layer member and a solar collector layer member bonded thereto; and

(b) a plurality of column means for supporting said solar collector monorail structure member.

4,987,834

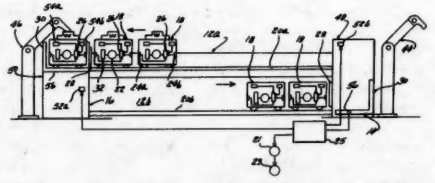
ACCUMULATING CONVEYOR WITH SELF-PROPELLED PALLETS

Glenn L. Peck, Jr., Grand Blanc; James F. Foster, Lansing, and Kenneth J. Pol, Saginaw, all of Mich., assignors to Roberts Sinto Corporation, Lansing, Mich.

Continuation of Ser. No. 227,490, Aug. 1, 1988, abandoned, which is a continuation of Ser. No. 922,497, Oct. 23, 1986, abandoned. This application Jun. 20, 1989, Ser. No. 370,141

Int. Cl.[5] B61J *3/12*

U.S. Cl. 104—300 **14 Claims**



1. An accumulating conveyor (**10**) including a track (**20**), one or more stations (**14**) arranged along said track (**20**), a plurality of pallets (**18**) greater in number than said one or more stations (**14**) whereby said pallets (**18**) are accumulated upstream from each of said one or more stations (**14, 16**), an operation performed on each of said workpieces (W) at said one or more stations (**14**);

each of said plurality of pallets (**18**) having a propelling drive motor (**22**), each of said plurality of pallets (**18**) disposed on said track (**30**) in a series for self propelled movement along said track (**20**), said track (**20**) directing said self propelled pallets (**18**) into each of said one or more stations (**14, 16**);

station control means (**40***a*, **40***b*, **42***a*, **42***b*, **24**, **30**) for causing stopping of each of said pallets (**18**) in each of said stations (**14, 16**) by discontinuing propelling drive thereof;

accumulating control means (**24, 26**) carried by each pallet (**18**) in which said pallets (**20**) are able to be queued one behind the other upstream at one or more of said stations (**14, 16**), said accumulating control means including reflective photoelectric sensor means (**24**) carried by each pallet (**18**) sensing the approach of said pallet (**18**) to the next ahead pallet (**18**) in said series, by optically detecting an object directly in the path of movement of said pallet at a predetermined substantial distance therefrom; said accumulating control means further including means (**26**) responsive to said reflective photoelectric sensor means (**24**) sensing the approach of said pallet (**18**) to a next ahead pallet (**18**) but not responsive to the approach of another pallet (**18**) to the rear, the discontinue the propelling drive of said pallet (**18**) by said drive motor (**22**) as said pallet (**18**) approaches the next ahead pallet (**18**) so as to stop said pallet (**18**) in a position spaced behind the next ahead pallet (**18**), said predetermined substantial distance is greater enough to insure stopping of said pallet (**18**) with no contact with the next ahead pallet (**18**) but is small enough to result in closely spaced queued pallets when a series of pallets (**18**) are stopped, said accumulator control means again causing initiation of propelling drive to each pallet (**18**) upon movement of the next ahead paliet (**18**) away therefrom beyond said predetermined substantial distance;

said accumulating control means characterized by readiness barrier (**28**) movably mounted to be selectively positioned upstream of at least one of said stations located at a height to be detected by said photoelectric sensor means to cause stopping of said pallet without a collision therewith, said barrier configured to physically prevent propulsion of a pallet therepast in the event said accumulator control means fails, whereby said pallets (**18**) may be queued behind each other, closely spaced and upstream of each of said stations (**14, 16**) behind said readiness barrier and are automatically moved ups step by step as each pallet (**18**) is propelled into each of said stations (**14, 16**) after removal of said readiness barrier.

4,987,835

AUTOMATIC VERTICALLY ADJUSTABLE WORK SURFACE

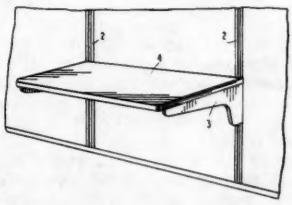
Edward M. Schwartz, Kansas City, and Wilburn D. Everman, Belton, both of Mo., assignors to Edtech Company, Kansas City, Mo.

Continuation-in-part of Ser. No. 268,415, Nov. 8, 1988. This application Nov. 1, 1989, Ser. No. 430,556

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.[5] A47B *9/12*

U.S. Cl. 108—144 **21 Claims**



1. A vertically adjustable, work station mounted to a wall panel, comprising:

a first pair of horizontally spaced, vertically oriented stationary rails secured to said wall panel;

a work surface;

a pair of support brackets for supporting said work surface;

a second pair of elongate, vertically oriented, rails individu-

ally slidably mounted to said first pair of support rails, respectively;

means for individually mounting said support brackets and thus said work surface to said second pair of rails;

an elongate, horizontally oriented, movable channel member interconnecting said second pair of rails; and

drive means coupled between said panel and said channel member for selectively displacing said channel member upward or downward to attendantly vertically displace the work surface.

4,987,836

SAFES

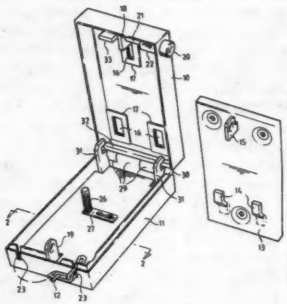
John S. Owen, 3 Jane Lane, Klippoortjie, Transvaal, South Africa

Filed Nov. 3, 1989, Ser. No. 431,635

Claims priority, application South Africa, Nov. 4, 1988, 88/8272

Int. Cl.[5] E05B *65/52*

U.S. Cl. 109—52 **7 Claims**



1. The combination of a readily portable safe and a bracket plate comprising a bracket plate adapted to be secured to a solid surface, hooked lugs projecting from the plate, a safe body having a base formed with slots adapted to pass over the lugs and on relative sliding movement engaging with the lugs to hold the base against the plate, a lid hinged to the body, formations on the body and lid with holes which register with a hole in one of the lugs on closure of the lid, and a lock having a bolt to engage with the registering holes to lock the lid and the body together and to lock the base against sliding movement in the direction for unbracketing the safe.

4,987,837

SIFTINGS REMOVAL DEVICE

David C. Reschly, Monroe, and Kenneth D. Alt, Erie, both of Mich., assignors to Detroit Stoker Company, Monroe, Mich.

Filed Jan. 2, 1990, Ser. No. 459,990

Int. Cl.[5] F23J *1/00*

U.S. Cl. 110—165 R **18 Claims**

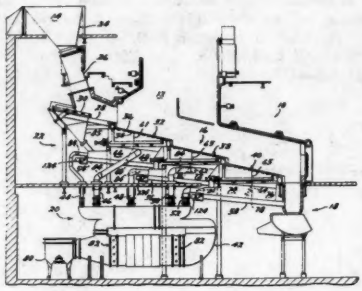
1. An apparatus for conveying ash in a furnace having a grate with openings therethrough, said apparatus comprising:

a hopper for receiving ash falling through said grate;

conveyor means extending the length of said hopper for removing ash from said hopper;

air seal means for dividing said hopper into separate air chamber wherein said conveyor means extends through a plurality of said air chambers;

air supply means to independently supply pressurized air for combustion to said separate air chambers, from which it blows through said grate to aid in the combustion of fuel on said grate; and



means to independently control the pressure of air supply to each said air chamber.

4,987,838

DEVICE FOR INJECTING PREHEATED AIR INTO A SHAFT FURNACE

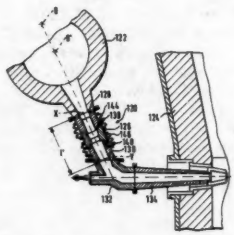
Pierre Mailliet, Howald; Emile Lonardi, Bascharage; Georges Wahl, Lorentzweiler, and Gustave Hoelpes, Mondorf-les-Bains, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Jul. 14, 1989, Ser. No. 380,129

Claims priority, application Luxembourg, Jul. 19, 1988, 87283; Apr. 21, 1989, 87505

Int. Cl.[5] F23L *5/00*

U.S. Cl. 110—182.5 **11 Claims**



1. An apparatus for directing preheated air from a supply pipeline to an elbow and tuyere assembly for injecting the air into a shaft furnace, comprising:

a refractory lined first tubular element extending along a first longitudinal axis from a first end to a convex second end having a first center of curvature which coincides with a point on the first axis;

a refractory lined second tubular element extending along a second longitudinal axis from a convex first end to a second end, said convex first end having a second center of curvature which coincides with a point on the second axis and said second end being adapted for connecting to the elbow of the elbow and tuyere assembly;

a refractory lined third tubular element extending along a third longitudinal axis from a concave first end to a concave second end, said concave first end articulating with the convex second end of the first element to form a first ball-and-socket joint and said concave second end articulating with the convex first end of the second elbow to form a second ball-and-socket joint so that the third axis passes through the first and second centers of curvature;

first sealing means for sealing the first ball-and-socket joint;

second sealing means for sealing the second ball-and-socket joint; and

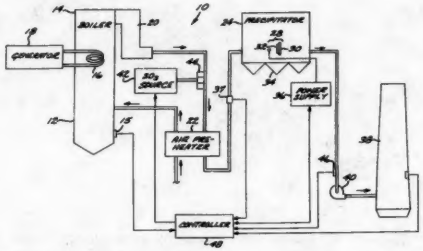
articulated means for pivotably connecting the first element to the second element.

4,987,839

REMOVAL OF PARTICULATE MATTER FROM COMBUSTION GAS STREAMS

Henry V. Krigmont, Seal Beach, and Everett L. Coe, Jr., Downey, both of Calif., assignors to Wahlco, Inc., Santa Ana, Calif.

Filed May 14, 1990, Ser. No. 523,312
Int. Cl.[5] F23J 3/00
U.S. Cl. 110—216 19 Claims



1. Apparatus for removing particulate matter from a combustion gas stream that is passed through an electrostatic precipitator having precipitating elements therein, comprising:

first means for selectively injecting a controllably variable amount of a conditioning agent into a combustion gas stream at a location prior to the entry of the combustion gas into an electrostatic precipitator;

second means for establishing the duty cycle of the power provided to a precipitating element in the electrostatic precipitator;

third means for measuring the relative particulate content of the combustion gas stream after it leaves the electrostatic precipitator; and

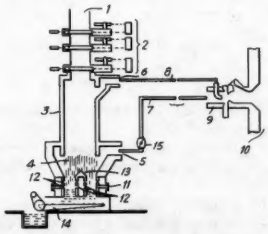
fourth means for controlling the first means and the second means in response to the measurement derived from the third means.

4,987,840

INCINERATOR WITH HIGH COMBUSTION RATE

Yoji Honda, Tokyo, Japan, assignor to Kiyoharu Michimae, Toyama, Japan

Continuation of Ser. No. 17,043, Feb. 19, 1987, abandoned. This application May 10, 1988, Ser. No. 193,187
Claims priority, application Japan, Feb. 27, 1986, 61-040342
Int. Cl.[5] F23G 5/00
U.S. Cl. 110—245 3 Claims



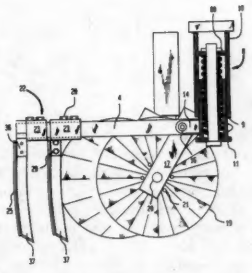
1. An incinerator with high combustion rate for incinerating objects having a wide range of moisture content and heating value and in which non-flammable and flame-resistant objects may be mixed comprising: a furnace body having a height preselected to be from 1.5–10 times the average internal diameter thereof, a combustion chamber being formed in a lower portion of said furnace body and provided with a plurality of air blast ports in a lower side wall of said furnace body, said combustion chamber having a diameter at least as large as the diameter of the furnace body and including a central bank located at the bottom of the combustion chamber for providing further air blast ports, gas exhaust ports being provided in the upper side wall of said combustion chamber and the side wall of the upper portion of said furnace body respectively, means located at the bottom of said furnace body for providing rapid ash and cinder removal and at least one duct for leading an exhaust gas from said exhaust ports to a place for making secondary use thereof.

4,987,841

COULTER WHEEL ASSEMBLY INCLUDING APPLYING DRY OR LIQUID FERTILIZER

Ray Rawson, 7413 N. Nottawa Rd., and Allen Rawson, 7323 N. Nottawa Rd., both of Farwell, Mich. 48622

Continuation-in-part of Ser. No. 248,617, Sep. 26, 1988. This application Mar. 24, 1989, Ser. No. 328,482
Int. Cl.[5] A01C 23/02, 5/06
U.S. Cl. 111—121 8 Claims



1. A coulter wheel assembly, comprising:

a main support arm lying in a substantially horizontal plane and having a long and a short axis and a forward and a rearward end;

a spring housing assembly having a long axis in a substantially vertical plane;

a spring housing linkage arm having first and second projections substantially perpendicular to each other, said first and second projections being pivotally connected together;

said first projection attached to said spring housing assembly;

said second projection attached to said main support arm at said main support arm's forward end;

a spring adjustably mounted and enclosedly contained within said spring housing assembly such that it provides bias to keep said main support arm in a substantially horizontal plane;

a coulter wheel linkage arm attached to the main support arm at an oblique angle and extending substantially downward and rearward therefrom;

a coulter receiving wheel rotatably attached to said coulter linkage arm at said coulter linkage arm's downward portion such that said wheels axis of rotation is substantially perpendicular to both the main support arm's long axis and the long axis of spring housing assembly;

a fluted coulter wheel attached to said coulter receiving wheel;

a mounting means for adjustably securing said spring housing assembly to a device supplying a motive force; and

means for applying fertilizer.

4,987,842

DETECTOR FOR USE ON SEWING MACHINE

Takashi Nakamura, and Yutaka Yamaura, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

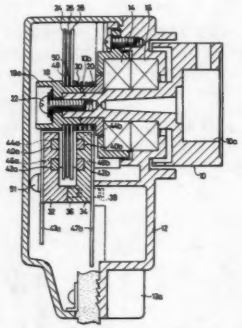
Continuation of Ser. No. 491,970, Feb. 28, 1983, abandoned. This application Jul. 15, 1988, Ser. No. 223,736

Claims priority, application Japan, Jul. 10, 1981, 46-107866; Jul. 10, 1981, 46-102701; Jul. 10, 1981, 46-102702; Jul. 10, 1981, 46-102703

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.[5] D05B *69/24*

U.S. Cl. 112—275 2 Claims



1. A detector for use on a sewing machine, comprising a coupling secured to an arm shaft of the sewing machine, a base supported on the coupling and having one end engaging a body of the sewing machine and held at rest in a given position, a plurality of photoelectric detector plates coaxially mounted in axially successive layers on the coupling and slippingly rotable thereon, said photoelectric detector plates having light shields disposed concentrically so that no one light shield on one of the photoelectric detector plates overlaps any of the other light shields, and light-emitting and photodetector means secured to the base and arranged one on each side of the set of photoelectric detector plates, said coupling having around a distal end thereof a first collar slippingly rotatable thereon, said detector further including a second collar disposed around said coupling and spring means disposed between said second collar and said plurality of photodetector plates, said photoelectric detector plates being mounted on said first collar under tension provided by said spring means so that the photoelectric detector plates are angularly adjustable into given angular positions with respect to the coupling, and all of the photoelectric detector plates are simultaneously rotatable with respect to the coupling by rotating the collar.

4,987,843

UPPER FEED ADJUSTING MECHANISM FOR SEING MACHINE

Takashi Kasuda, Osaka, Japan, assignor to Pegasus Sewing Machine Co., Ltd., Osaka, Japan

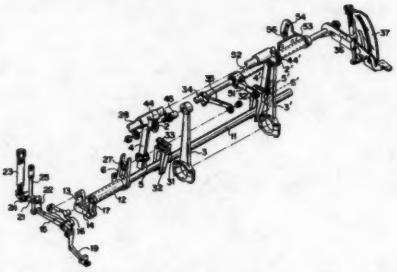
Filed Dec. 2, 1988, Ser. No. 279,559

Claims priority, application Japan, Jan. 29, 1988, 63-20483

Int. Cl.[5] D05B *27/04*

U.S. Cl. 112—320 8 Claims

4. An upper feed mechanism of a sewing machine comprising an upper feed bar having an upper feed dog detachably mounted to one end thereof; a horizontal motion mechanism coupled to the upper feed bar for moving the upper fed bar back and forth by means of a main shaft; and a vertical motion mechanism for moving the upper feed bar up and down in conjunction with the main shaft, in which the upper feed dog is disposed before a needle drop point or behind the needle drop point, the horizontal motion mechanism including a crank lever mechanism composed of a crank rotated and driven by the main shaft, a lever pivoted oscillatably and having two positions in a peripheral direction with respect to the lever, and a rod for coupling the crank and lever, thereby oscillating the lever by the rotation of the crank, and a transmission mechanism for transmitting the oscillation of the lever to the upper feed bar, the transmission mechanism containing an adjusting device for adjusting the upper feed amount without moving the upper feed dog, and the rod of the crank lever mechanism



being changeable over and linked by connecting means to either one of said two positions, said two positions having a defined interval, for coupling the crank while the crank is at a top or bottom end point depending on whether the upper feed dog is disposed before the needle drop point or behind the needle drop point, said horizontal and vertical motion mechanisms respectively possessing an oscillating shaft cooperating with the main shaft, one of the two oscillating shafts being a tubular shaft rotatably fitted onto the other shaft to make a double shaft structure.

4,987,844

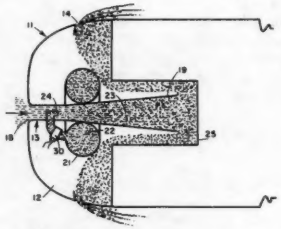
SYSTEM FOR REDUCING DRAG AND NOISE OF UNDERWATER VEHICLES

Richard H. Nadolink, Portsmouth, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 17, 1971, Ser. No. 116,284

Int. Cl.[5] F42G *19/00*

U.S. Cl. 114—20.1 6 Claims



1. A system for reducing the drag and noise of an aquatic vehicle comprising:

a container in said vehicle and a supply of carrier liquid with polymer powder in suspension therein stored in said container;

a passage for admitting water under pressure into said vehicle and means communicating between said container and said passage; said carrier liquid having a sufficient vapor pressure to force the contents of said container into said passage;

means for combining said carrier liquid and said polymer with the water in said passage, said polymer powder

pre-wetted by said carrier liquid and adapted to be divided into a substantially infinite number of particles upon mixing with the water under pressure in said passage, with a resultant rapid gas formation;

a chamber in said vehicle and said passage terminating therein; and

means for directing the contents of said chamber into the leading portion of the boundary layer of said vehicle,

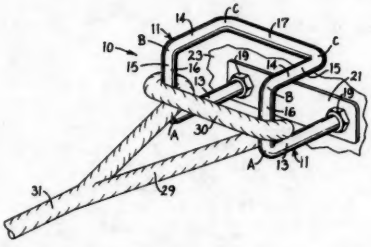
whereby drag and noise are reduced by gas formed in said vehicle and ejected with polymer into said boundary layer.

4,987,845

SKI TOW FIXTURE

Richard J. Camarota, Holland, Mich., assignor to ITC, Incorporated, Zeeland, Mich.

Filed Jun. 30, 1989, Ser. No. 375,271
Int. Cl.[5] B63B *21/58*
U.S. Cl. 114—253 **15 Claims**



1. An apparatus for removably securing a ski rope to the hull of a boat, comprising:

two base members, each said base member including a leg portion and a bent portion, said leg portions and said bent portions being integrally formed, said base members being bent back upon themselves to form respective said bent portions, said leg portion having first and second ends, said bent portion being connected to said leg portion at a location spaced from said first end and said bent portion extending from said leg portion to a free end, said free end of said bent portion extending generally toward said first end of said leg portion, said leg portions lying substantially in a common plane, said bent portions extending out of said common plane and being generally sidewardly spaced from each other; and

a transverse member extending generally sidewardly between and connecting said base members, said transverse member being connected to and formed integrally with said bent portions of said base members, said base members being generally sidewardly aligned relative to said transverse member so as to be substantially symmetric thereabout.

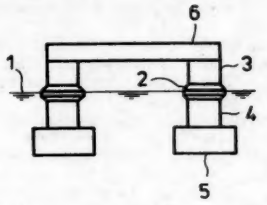
4,987,846

FLOATING STRUCTURE

Seiya Yamashita, Yokohama, and Haruo Sasaki, Tokyo, both of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 230,179, Aug. 9, 1988, abandoned. This application Jan. 8, 1990, Ser. No. 463,944
Claims priority, application Japan, Aug. 21, 1987, 62-126331
Int. Cl.[5] B63B *35/08*
U.S. Cl. 114—265 **2 Claims**

1. A floating structure comprising a deck and four supports for supporting said deck above the water surface, each of said supports comprising a column belt only in the vicinity of and across the water surface, said column belt having no opening therein, an upper column extending upwardly from said column belt and integrally attached thereto and having its upper end integrally attached to said deck, a lower column extending downwardly from said column belt and integrally attached thereto, and a floater below said lower column, diameters of



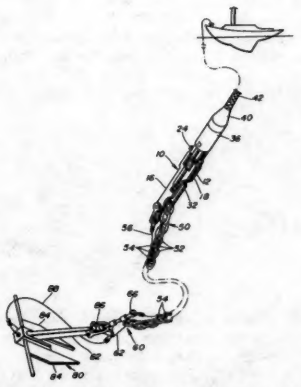
said upper and lower columns being substantially equal to each other, diameter of said column belt being greater than those of said upper and lower columns.

4,987,847

ANCHOR RETRIEVING DEVICE

Satoru Kobayashi, 33-8, Taishido 5-chome, Setagaya-ku, Tokyo 154, Japan

Filed May 18, 1990, Ser. No. 525,766
Claims priority, application Japan, May 19, 1989, 1-124539
Int. Cl.[5] B63B *21/24*
U.S. Cl. 114—297 **4 Claims**



1. An anchor retrieving device adapted to be interposed between an anchor and one end of a main anchoring line, said anchor including a shank having a crown end and at least one fluke, said anchor retrieving device transmitting the anchoring power from said main anchoring line to the end of said shank opposite to said crown end when it is held in the locking position and transmitting the anchor raising power from said main anchoring line to said crown end when it is held in the unlocking position, said anchor retrieving device comprising:

a first lock assembly having an upper end connected to said one end of said main anchoring line and having a hook member releaseably locked when said anchor retrieving device is in the locking position;

a weight slidably engaging said main anchoring line and adapted to be dropped downwardly along said main anchoring line to strike said first lock assembly;

a second lock assembly releaseably connected to said end of said shank opposite to said crown end and having releasing means for releasing said second lock assembly from said end of said shank opposite to said crown end when said anchor retrieving device is in the unlocking position;

a connection line for connecting said hook member to said second lock assembly for transmitting the anchoring

power from said main anchoring line through said first lock assembly and said second lock assembly to said end of said shank opposite to said crown end when said anchor retrieving device is in the locking position, said connection line having guide means disposed along said connection line;

an unlocking line for connecting the lower end of said first lock assembly to said releasing means of said second lock assembly while being guided through said guide means of said connection line; and

an anchor-retrieving line for connecting said second lock assembly to said crown end of said shank;

whereby the anchoring power is transmitted through said main anchoring line, said first lock assembly, said hook member, said connection line and said second lock assembly to said end of said shank opposite to said crown end of said shank when said anchor retrieving device is in the locking position, and said anchor retrieving device is turned to the unlocking position as said weight strikes said first lock assembly to release said hook member from said first lock assembly while said second lock assembly is unlocked by the power transmitted through said unlocking line so that the anchor raising power is transmitted through said main anchoring line, said first lock assembly, said connection line, said second lock assembly and said anchor-retrieving line to said crown end of said shank.

4,987,848

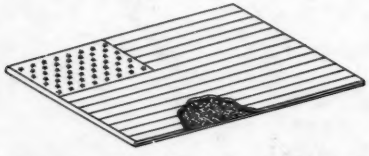
RADAR REFLECTING SAFETY FLAG

David P. Todd, P.O. Box 662, Dania, Fla. 33004

Continuation of Ser. No. 64,076, Jun. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 846,099, Mar. 31, 1986, abandoned. This application Feb. 26, 1990, Ser. No. 462,878

Int. Cl.[5] G09F *17/00*

U.S. Cl. 116—173 **7 Claims**



1. A dual purpose visual identification and safety flag comprising at least one sheet portion carrying anon-emergency visible identification display and substantially coextensive with the sheet portion a flexible radar reflecting portion of silver anodized rip-stop nylon and means for attaching the flag to a support.

4,987,849

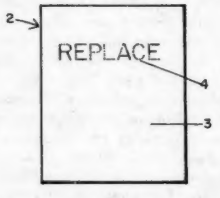
SIGNAL DEVICE

Daniel A. Sherman, 1355 Bobolink Pl., Los Angeles, Calif. 90069

Filed Sep. 22, 1989, Ser. No. 411,017

Int. Cl.[5] G01D *21/00*

U.S. Cl. 116—206 **3 Claims**



1. A signal device consisting of first and second inks applied to a surface; said first ink being sensitive to light; said second ink being stable in the presence of light and/or air; said surface having first and second areas, wherein said second ink is applied in word or character form to said first area to form a signal word; said first ink is applied to said second area and being of a color so as to cooperate with said second ink to camouflage the signal word; a protective shield means to block said sensitive ink from exposure to light or air; and wherein after a metered period of time of exposure to light said sensitive ink fades such that the contrast in color between the faded sensitive ink and stable ink reveals said signal word.

4,987,850

APPARATUS FOR THE WETTING OF SEEDS

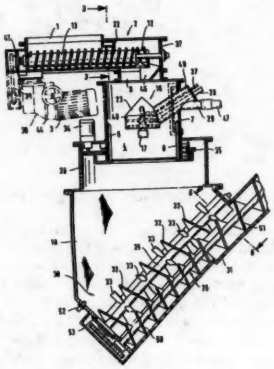
Alan McCracken, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 30, 1989, Ser. No. 358,288

Claims priority, application Switzerland, Jun. 6, 1988, 2140/88

Int. Cl.[5] B05C *5/00*

U.S. Cl. 118—303 **44 Claims**



42. Apparatus for the wetting of seeds with active ingredients dissolved in a liquid, said apparatus comprising:

a feeder and metering device, an opening of which is directed from above into a spray chamber having an open bottom, the feeder and metering device including an essentially horizontal screw conveyor with at least two mutually cooperating conveyor screws and a baffle extending into a portion of a space between said screws, the conveyor screws having turns with a depth of an order of magnitude of the seed grains to be treated; an atomizer for a liquid active ingredient, said atomizer being located in the bottom of the spray chamber, and, a mixing and discharge means located under the spray chamber.

4,987,851

APPARATUS FOR FORMING ORGANIC THIN FILM

Satoshi Yasuda, Kawasaki; Shigeru Wakayama, Yokohama; Yoshiaki Tsukumo, Tokyo; Takashi Haraguchi, Fujisawa, and Syun Egusa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 30, 1988, Ser. No. 292,314

Claims priority, application Japan, Jan. 12, 1988, 63-3237; Dec. 5, 1988, 63-306039

Int. Cl.[5] B05C *13/00, 3/02*

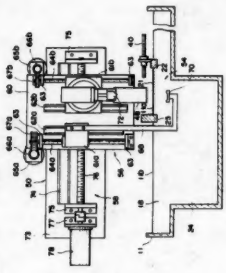
U.S. Cl. 118—403 **39 Claims**

1. An apparatus for forming an organic film on a surface of a work, comprising:

developing means for storing a liquid and defining a devel-

oping region on a liquid surface of the liquid on which organic molecules can be developed; and

work drive means for moving said work in a desired direction through the developing region causing a monomolecular film developed on the developing region to attach on



the surface of said work, said work drive means including holding means, having a holding portion engaged with said work, for holding said work so that said work passes entirely through the developing region on which the monomolecular film is developed, while said work drive means is away from the developing region.

4,987,852

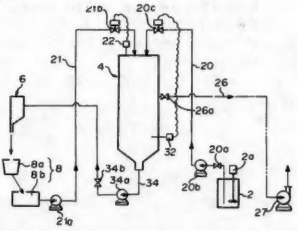
APPARATUS FOR REMOVING BUBBLES IN PAINT AND A PAINT COATING SYSTEM INCLUDING THE BUBBLE REMOVING APPARATUS

Tomoharu Sakai, 1-16-103, Asahigaoka, Toyonaka-shi, Osaka; Eizo Yoshida, Kyoto; Hiroshi Mihara, Nara, and Toshio Adachi, Osaka, all of Japan, assignors to Tomoharu Sakai, Toyonaka; Dai Nippon Toryo Co., Ltd., Osaka and Meishin Kabushiki Kaisha, Osaka, all of, Japan

Filed Jul. 12, 1989, Ser. No. 378,774

Int. Cl.[5] B05C *11/00*

U.S. Cl. 118—603 **7 Claims**



1. A system for coating paint which comprises:

a tank for storing a new paint;

a bubble removing apparatus comprising a sealed container, a plate having at least one slit which is disposed in said sealed container to divide the same into upper and lower sections and a pressure reducing means for removal of bubbles comprising an outlet valve connected to said lower section of the container;

a first paint feeding means to feed paint from said tank to a first inlet in said upper section of the sealed container;

a paint coating device for forming a coating layer on an object to be coated, said paint coating device being in communication with an outlet in said lower section of said sealed container so as to receive paint without bubbles; and

a paint recovering means fluidly communicating with said paint coating device to recover or collect the paint which does not contribute to form said coating layer.

4,987,853

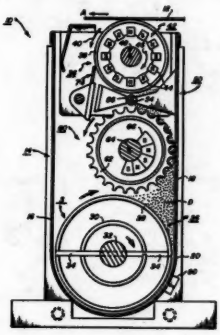
MAGNETIC BRUSH DEVELOPMENT APPARATUS

Richard Allen; Paul Hartley, Thomas Hilbert; Andrew Mauer; Thomas Stetz, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 280,068

Int. Cl.[5] G03G *15/09*

U.S. Cl. 118—657 **4 Claims**



1. Magnetic brush development apparatus for applying developer material to a latent image, said apparatus comprising:

a housing having a portion defining a sump adapted to contain a supply of developer material;

a magnetic brush, located substantially within said housing in spaced relation to said sump portion, for applying developer material to a latent image;

a feed mechanism located within said housing between said sump portion and said magnetic brush for transporting developer material from said sump portion to said magnetic brush;

means, located in said sump portion, for agitating developer material and transporting developer material to said feed mechanism; and

a stationary magnet attached to the external wall of said housing adjacent to said sump portion substantially upstream of said feed mechanism with respect to the direction of transport of said developing material from said agitating and transporting means to said feed mechanism, the field of said magnet being oriented to act on developer material being agitated and transported by said agitating and transporting means to balance developer material flow distribution from front to rear in said housing.

4,987,854

APPARATUS FOR GAS-AIDED DISPENSING OF LIQUID MATERIALS

Robert C. Hall, Strongville, Ohio, assignor to Nordson Corporation, Westlake, Ohio

Filed Dec. 12, 1988, Ser. No. 283,259

Int. Cl.[5] B05C *13/00*

U.S. Cl. 118—679 **26 Claims**

1. An apparatus for dispensing fluid material onto a workpiece, said apparatus comprising:

(a) inlet means connectable to a source of the material for receiving material from said source;

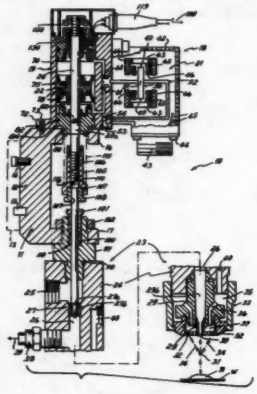
(b) nozzle means communicating with said inlet means and having an outlet for discharging a stream of the material toward the workpiece to form a deposit of the material thereon;

(c) gas jet forming means for forming at least one gas jet impinging upon at least one of, said stream and said deposit to impart a desired conformation to said deposit;

(d) sensing means for generating a first signal correlated to the flow rate of the fluid material, and

(e) control means connected to said gas jet forming means,

said control means utilizing at least said first signal for generating a control signal for modulating the flow of gas



issuing from said gas jet forming means as to maintain substantial uniformity of said conformation of said deposit of material.

4,987,855

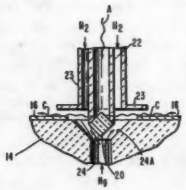
REACTOR FOR LASER-ASSISTED CHEMICAL VAPOR DEPOSITION

William L. Ahlgren, Goleta, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.

Filed Nov. 9, 1989, Ser. No. 484,642

Int. Cl.[5] C23C *16/48*

U.S. Cl. 118—722 **13 Claims**



1. Apparatus for use in a chemical vapor deposition chamber comprising:

means having a surface for supporting at least one substrate during a deposition of material upon a surface of the substrate, the material being obtained from reactants within the chamber; and

means for providing a substantially planar beam of radiation substantially parallel and adjacent to the surface of the substrate, the beam photolysing the reactants to obtain the deposited material therefrom, said means for providing comprising:

an optical conduit for delivering ultraviolet radiation to a centrally disposed region of said supporting means, said optical conduit comprising a cylindrical window that is substantially transparent to ultraviolet radiation;

a reflector positioned relative to said conduit for reflecting the radiation received therefrom to form the substantially planar beam of radiation; and

a gas flow conduit coaxially disposed about said optical conduit for purging said window with a gas flow to prevent the deposition of material upon said window.

4,987,856

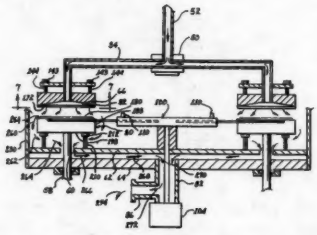
HIGH THROUGHPUT MULTI STATION PROCESSOR FOR MULTIPLE SINGLE WAFERS

H. Peter W. Hey, Phoenix; William A. Mazak; Ravinder K. Aggarwal, both of Mesa, and John H. Curtin, Phoenix, all of Ariz., assignors to Advanced Semiconductor Materials America, Inc., Phoenix, Ariz.

Filed May 22, 1989, Ser. No. 354,922

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—723 **27 Claims**



1. A CVD reactor having at least two stations for processing one wafer at each station, said reactor comprising in combination:

(a) one susceptor disposed at each station for supporting a single wafer, the number of said susceptors being commensurate with the number of stations within said reactor;

(b) a gas dispersion head associated with each of said susceptors for dispersing a gas upon the associated susceptor supported wafer; and

(c) means for urging outward radial flow of the gas across each of the susceptor supported wafers to the peripheral edge of the respective wafers and downwardly along the peripheral edge of the respective one of said susceptors.

4,987,857

VACUUM DEPOSITION APPARATUS WITH DUST COLLECTOR ELECTRODE

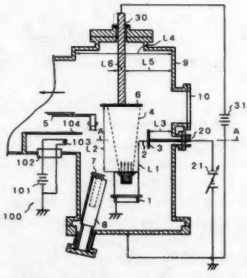
Kenichi Aketagawa, and Junro Sakai, both of Fuchu, Japan, assignors to Anelva Corporation, Tokyo, Japan

Filed May 8, 1989, Ser. No. 348,538

Claims priority, application Japan, Jun. 21, 1988, 63-152859; Nov. 10, 1988, 63-284457

Int. Cl.[5] C23C *16/50*

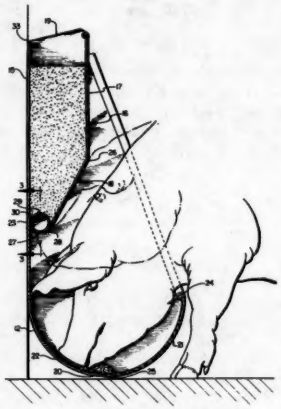
U.S. Cl. 118—723 **5 Claims**



1. A vacuum deposition apparatus comprising a vacuum deposition chamber provided therein with at least one dust collector electrode between which and an evaporation source a high DC voltage is applied to give said at least one dust collector electrode an electric force by which dust particles and molecular clusters in a space in said vacuum deposition chamber are removed, and further with an electron beam source which generates an electron beam with which a space

in the proximity of said at least one dust collector electrode is irradiated.

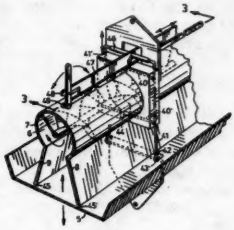
4,987,858
ANIMAL FEEDING DEVICE
Stanley E. Curtis, Mahomet, and Ian A. Taylor, Champaign, both of Ill., assignors to The Board of Trustees of the University of Illinois, Urbana, Ill.
Filed Sep. 14, 1988, Ser. No. 244,031
Int. Cl.[5] A01K *5/00*
U.S. Cl. 119—54 14 Claims



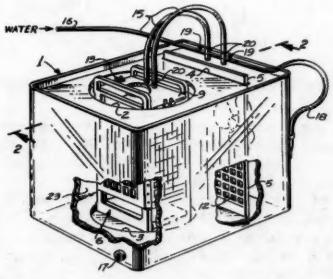
1. A mechanism for dispensing animal feed from a feed reservoir, having a lower end and a throat at said lower end, to a position substantially below said reservoir,
said feed dispensing mechanism comprising:
an internal support member;
means mounting said support member at said throat;
a plurality of tubular segments disposed in adjacent, hanging relation around said support member;
said segments and said support member comprising means cooperating to mount each segment for vertical and lateral movement between a first position, wherein said segments jointly substantially occlude flow of feed from said reservoir through said throat, and a second position, displaceable from said first position, wherein said segments are displaced and allow feed to flow from said reservoir through said throat and to a position substantially below said reservoir;
said mounting means for said segments comprising means permitting tilting of individual segments;
said dispensing mechanism being devoid of external restraints against said tilting.

4,987,859
POULTRY FEEDER
John Vanderzanden, 158 Dalewood Cresent, Hamilton Ontario, Canada L8S 4B7
Filed Jan. 10, 1990, Ser. No. 463,133
Int. Cl.[5] A01K *39/014*
U.S. Cl. 119—57.7 10 Claims

1. An automatic feeder comprising an elongated feed tube including a feed auger, a shallow feed trough supported by said feed tube and extending substantially the entire length of said feed tube, a slot in said tube and a pair of walls, one extending from each of the edges of said slot towards said trough, at least a portion of the edges of said walls spaced a selected distance from said trough, a plurality of identical support structures joining said tube and said trough and adjustably suspended by cables from an overhead support member, said support structures having suspension brackets, a first set of cables connected to said suspension brackets and means to raise said cables.



4,987,860
SMALL ANIMAL BATH
Brad S. Davis, 2445 Juan St., San Diego, Calif. 92110
Filed Jun. 1, 1990, Ser. No. 531,556
Int. Cl.[5] A61D *11/00*
U.S. Cl. 119—158 1 Claim



1. A liquid bath for a small animal comprising
a transparent outer container which has liquid tight sides and bottom,
a removable top which may be affixed to said transparent outer container,
said removable top having an access hole,
an agitator means incorporated into said transparent outer container to move said liquid,
a dip basket of four penetrable sides, a moveable bottom platform, and a top,
said top with an aperture to accommodate the passage of said small animal head,
a spray ring circumscribing said aperture,
a multiplicity of tubes, connectors and valves interconnecting said spray ring with external plumbing to permit the flow of liquid into said spray ring and into said transparent outer container,
said penetrable sides of an open grid design permitting free-flow of said liquid through said penetrable sides,
a paw grasp at the top of said penetrable sides,
said moveable bottom platform of said dip basket having a clip means to attach said moveable platform to said penetrable sides so the dimensions of said dip basket may be restricted and said animal can rest its front paws on said paw grasp while standing upright on said movable bottom in said dip basket,
said dip basket insertable into said access hole of transparent outer container
so that when said small animal is placed into said dip basket which has been properly dimensioned, said animal will be constrained to stand in an upright position with its fore-

paws on said paw grasp of said dip basket with said animal poking its head out through said aperture which is large enough to admit said animal head but not the shoulders of the animal,

then said container can be filled with liquid which is sprayed and agitated about said animal who is held captive in the bath system described above.

4,987,861

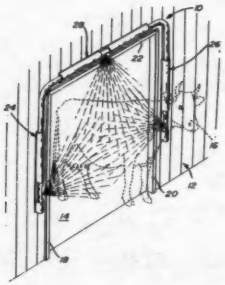
APPARATUS FOR SPRAYING ANIMALS

Paul-Emile Lemire, Ancienne Lorette, and Jean-Pierre Boyer, Brossard, both of Canada, assignors to Les Plastiques Lemire, Inc., Ville Vanier, Canada

Filed Jan. 16, 1990, Ser. No. 465,972

Int. Cl.[5] A01K *29/00*

U.S. Cl. 119—159 **7 Claims**



1. An animal spring apparatus adapted to be mounted to entranceway frames of varying dimensions, each frame being defined by a head and two opposite side jambs, comprising:

(a) an inverted U-shaped tubular structure consisting of a pair of opposite side portions adapted to be mounted to the side jambs of the entranceway and an intermediate horizontal upper portion adapted to be mounted to the head of the entranceway, each of said upper and said side portions including

(i) a vapourizing unit consisting of a housing adapted to be mounted to the entranceway frame and of nozzle carrying means mounted to said housing; and

(ii) tubular connecting members each having one end telescopically received in the housing of said upper portion and an opposite end thereof telescopically received in the housing of an adjacent one of the side portions whereby the tubular structure may be mounted according to the dimensions of the entranceway frame by telescopically adjusting the relative positions of said one end and said opposite end of said connecting members in said housings;

(b) means mounted on said tubular structure for detecting the presence of an animal in the entranceway; and

(c) means extending in said housings and said connecting members for directing spraying fluid from a remote reservoir to said nozzle carrying means when an animal is present in said entranceway.

4,987,862

ONCE-THROUGH STEAM GENERATOR

Eberhard Wittchow, Erlangen, and Wolfgang Koehler, Kalchreuth, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

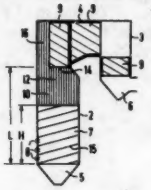
Filed Jun. 28, 1989, Ser. No. 373,081

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1988, 3822606

Int. Cl.[5] F22B *37/00*

U.S. Cl. 122—6 A **18 Claims**

1. Once-through steam generator, comprising a vertical gas flue having a lower part with a lower end, an upper part with an upper end, a total given height between said lower end of said lower part and said upper end of said upper part, a bottom, and a transverse partition, said lower part having a height equal to less than 70% of said total given height, and fossil fuel burners disposed on said lower part, said lower and upper parts



being formed of gas-tight tube walls with tubes, said tubes of said lower part rising obliquely, said tubes of said upper part being vertical, said lower part being limited at said lower end by said bottom, and said upper part being limited at said upper end by said transverse partition.

4,987,863

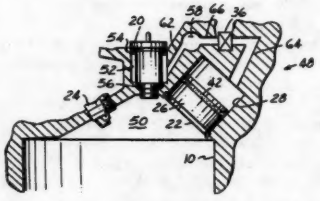
VARIABLE COMPRESSION RATIO INTERNAL COMBUSTION ENGINE

Paul D. Daly, Troy, Mich., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Sep. 28, 1989, Ser. No. 414,040

Int. Cl.[5] F02B *75/04*

U.S. Cl. 123—48 AA **11 Claims**



1. A variable compression ratio internal combustion engine having at least one cylinder, a reciprocating piston disposed in said cylinder and a source of pressurized fluid comprising:

a cylinder head attached to one end of said cylinder and forming in conjunction therewith a combustion chamber;

a piston chamber provided in said cylinder head having an open end in communication with said combustion chamber and a closed end;

a movable piston disposed in said piston chamber and displaceable therein to change the effective volume of said combustion chamber;

a fluid passageway connecting said closed end of said piston chamber to said source of pressurized fluid;

a solenoid valve for controlling the fluid flow in said fluid passageway between at least said piston chamber and at least said source of pressurized fluid to change the position of said movable piston in said piston chamber and thereby change the compression ratio of said combustion chamber;

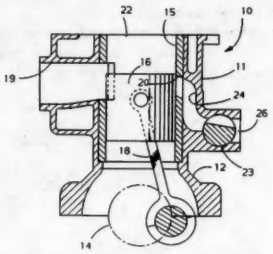
said source of pressurized fluid being the engine's pressurized oil supply; and

said solenoid valve being a two-way valve connected between said piston chamber and said pressurized oil supply.

4,987,864
TWO CYCLE ENGINE WITH VALVED PRESSURE SCAVENGING

Ronald J. Cantrell, Belleville; Edward D. Klomp, Mount Clemens; Edward G. Groff, Troy; James G. Solomon, Grosse Pointe Woods, and Michael J. Gorman, Royal Oak, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,220
Int. Cl.[5] F02B *75/02*
U.S. Cl. 123—65 BA **9 Claims**



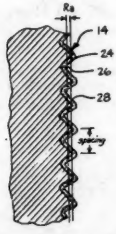
1. A two cycle engine having multiple cylinders, each with an inlet port and a reciprocable piston operative to open and close the inlet port, pressurized air supply means connected via separate passages with the inlet ports of the cylinders for delivering pressurized scavenging and charging air to the cylinders, and a valve in each of the passages and spaced from their respective inlet ports to additionally control the supply of pressurized air to the passage portions adjacent the respective inlet ports, wherein

each said valve is timed to be open during an initial scavenging interval after port opening and a final charging interval before port closing by the piston and said valve is timed to be closed during the intermediate period in which the port is open to limit the supply of pressurized air to the initial scavenging and final charging intervals.

4,987,865
REDUCED FRICTION PISTON

Jerry Schenkel, Holland, Mich., assignor to Wickes Manufacturing Company, Southfield, Mich.

Filed Oct. 11, 1989, Ser. No. 419,930
Int. Cl.[5] F02F *3/00*
U.S. Cl. 123—193 P **6 Claims**



1. A piston assembly of the type for reciprocating in a cylinder of an internal combustion engine, said assembly **(10)** comprising:

a piston head **(12)**;

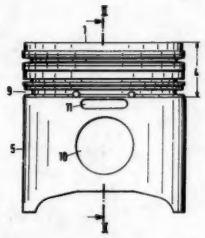
and a piston skirt **(14)** integral with said piston head **(12)** and depending therefrom; said piston skirt **(14)** including an outer surface adapted for engaging the cylinder;

said assembly **(10)** characterized by said outer surface of said piston skirt **(14)** having a surface roughness comprising a plurality of pointed ridges **(24)** separated by valleys **(26)** engaging the cylinder walls, with said ridges having an Ra measurement from between about 100 to about 180 microinches, said ridges having an Rz measurement of from between about 500 microinches to about 800 microinches, and said ridges having an average spacing of from about 0.010 inches to about 0.014 inches.

4,987,866
LIGHT ALLOY PISTON FOR INTERNAL COMBUSTION ENGINES

Siegfried Mielke, Neckarsulm; Wilfried Weber, Hamburg, and Werner Steidle, Friedrichshall, all of Fed. Rep. of Germany, assignors to Kolbenschmidt Aktiengesellschaft, Neckarsulm, Fed. Rep. of Germany

Filed Mar. 16, 1990, Ser. No. 495,812
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1989, 3908810
Int. Cl.[5] F02F *3/00, 3/26;* **C22C** *21/00*
U.S. Cl. 123—193 P **14 Claims**

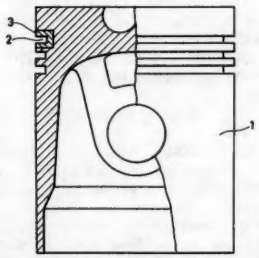


1. A light alloy piston for internal combustion engines, comprising: a top portion including a piston head formed with a combustion chamber recess and the ring groove portion, a skirt with integrated piston pin bosses having a support and bore means forming at least one blind hole in portions disposed between a lowermost ring groove and a top apex of the bores and extending from an outside peripheral surface of the skirt inwardly on both sides of a plane which contains a piston axis and the direction of the piston pin axis.

4,987,867
PISTON FOR INTERNAL COMBUSTION ENGINES

Yoshihiro Suzuki, Fukiagemachi; Toshio Ogiwara, Mochida, and Masaaki Kudo, Muraoka, all of Japan, assignors to Izumi Industries, Ltd., Saitama, Japan

Filed Nov. 6, 1989, Ser. No. 431,765
Int. Cl.[5] F02F *3/00*
U.S. Cl. 123—193 P **8 Claims**



1. A piston for internal combustion engines, said piston comprising an aluminum alloy body and an annular member of porous metal embedded in said body by casting said aluminum alloy around said annular member under high pressure, said porous metal defining pores of said annular member, said

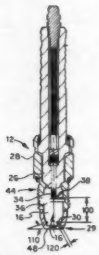
annular member defining a piston-ring groove, said porous metal characterized by a volumetric ratio between 10% and 60%, said aluminum alloy having penetrated into said pores of said annular member as a result of said casting to thereby form a composite layer of said porous metal and said alloy, said composite layer having a surface layer defined by the region of said annular member adjacent said body, said surface layer comprising more than 10% chromium.

4,987,868

SPARK PLUG HAVING AN ENCAPSULATED CENTER FIRING ELECTRODE GAP

Ronald D. Richardson, Pekin, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed May 8, 1989, Ser. No. 348,830
Int. Cl.[5] F02B *19/12*
U.S. Cl. 123—260 **11 Claims**



1. A spark plug specially adapted for use in a lighter-than-air gaseous fuel burning engine having a shell, a center electrode, and a ground electrode, said electrodes spaced one from the other and forming an electrode gap, comprising:

an insulator fixedly held in said shell and extending at least 5.2 centimeters beyond said shell, and

a capsule having an ignition chamber and an orifice system for the controlled exchange of gases into and from said ignition chamber, said capsule being connected to said spark plug shell and surrounding said electrode gap, said electrode gap being substantially centered within said ignition chamber, said orifice system having a plurality of orifices of a size, orientation and position adapted for the entry of fuel gas and air through said orifices, into said ignition chamber, and along a swirling pathway around said electrode gap.

4,987,869

DEVICE FOR CONTROLLING A VEHICLE ENGINE-BRAKING SYSTEM

Walter Hilburger, Nürtingen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed May 2, 1990, Ser. No. 517,723
Claims priority, application Fed. Rep. of Germany, May 4, 1989, 3914698
Int. Cl.[5] F02D *9/06*
U.S. Cl. 123—323 **8 Claims**

1. Device for controlling an engine-braking system of an internal-combustion engine driving a vehicle comprising:

at least one brake flap arranged in an engine exhaust-gas line,

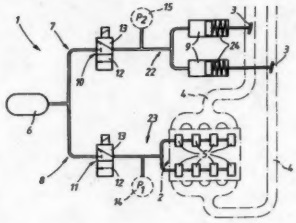
constant-throttle valves provided in engine cylinder heads, said constant-throttle valves being open and the brake flap being closed when the engine-braking system is activated,

a pressure accumulator connected to a fluidic line system having first and second line branches, the at least one brake flap being actuable via the first line branch and the constant-throttle valves being actuable via the second line branch,

a first valve arrangement with first and second switch positions, disposed in the first line branch, the first switch position causing communication between the pressure accumulator and an actuator actuating the at least one brake flap and the second switch position shutting off the line portion towards the pressure accumulator and venting the actuator to the environment,

and a second valve arrangement with two switch positions, disposed in the second line branch, the first switch position causing communication between the pressure accumulator and the constant-throttle valves and the second switch position shutting off the line portion towards the pressure accumulator and venting the constant-throttle valves to the environment,

wherein, above a predetermined engine speed threshold value, the first valve arrangement is in its first switch position when a switch unit is actuated for activating the



engine-braking system and when the pressure in the line portion between the second valve arrangement and the constant-throttle valves is simultaneously above a predetermined first limit pressure,

wherein the second valve arrangement is in its first switch position either when, above the predetermined engine speed threshold value, the switch unit is actuated for activating the engine-braking system or when, after the release of the switch unit, the pressure in the line portion between the first valve arrangement and the actuator for actuating the brake flap is above a second limit pressure, the second limit pressure being lower than the first limit pressure,

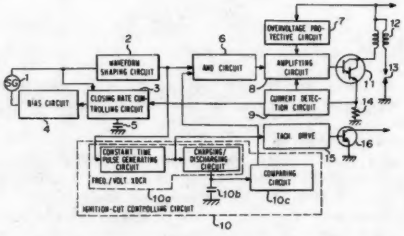
and wherein the two valve arrangements are in their second switch position when the speed of the internal-combustion engine is below the predetermined threshold value.

4,987,870

IGNITION DEVICE FOR AN ENGINE

Mitsuru Koiwa, and Toshiyuki Hino, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 5, 1989, Ser. No. 417,419
Claims priority, application Japan, Oct. 11, 1988, 63-253840
Int. Cl.[5] F02P *3/04*
U.S. Cl. 123—335 **1 Claim**



1. An ignition device for an engine, which comprises:

a signal generator for generating a signal in synchronism with the rotation of an engine,

a waveform shaping circuit for shaping the waveform of an output signal produced by said signal generator,

an ignition device for determining ignition timing on the basis of the output of said waveform shaping circuit and for causing ignition in the engine,

an ignition cutoff controlling circuit for cutting off the igniting operation of said ignition device when the engine operates at more than a predetermined number of revolutions,

a tachometer signal output circuit for detecting the number of revolutions of the engine on the basis of the output of said waveform shaping circuit, and

a tachometer driving means for receiving the output of said tachometer signal output circuit and for driving a tachometer to indicate the engine speed, wherein said ignition cutoff controlling circuit includes a frequency-voltage transducing circuit which is connected to said waveform shaping circuit, and said tachometer signal output circuit is driven by a constant time pulse generating circuit of said frequency-voltage transducing circuit.

4,987,871

OPERATION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES AT AND AFTER STARTING

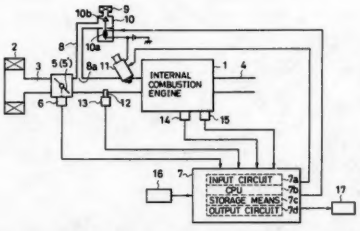
Takafumi Nishikawa, Wako, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Feb. 3, 1989, Ser. No. 306,825

Claims priority, application Japan, Feb. 7, 1988, 63-25934

Int. Cl.[5] F02D *41/06*

U.S. Cl. 123—362 **26 Claims**



1. In a system for controlling the operation of an internal combustion engine having an intake passage, including temperature sensor means for sensing a temperature of said engine, control valve means for controlling an amount of intake air supplied into said intake passage of said engine, valve opening determining means responsive to an output from said temperature sensor means for determining the opening of said control valve means at the start of said engine, and valve actuator means responsive to an output from said valve opening determining means for controlling said control valve means,

the improvement including starting period detecting means for detecting whether or not a starting state of said engine has lasted over a predetermined period of time and intake air amount correcting means for correcting the amount of intake air to a larger value after said predetermined period of time has elapsed, said predetermined period of time being set to a shorter value as the temperature of said engine is lower,

wherein said valve opening determining means sets the opening of said control valve at the start of said engine to a value such that the amount of intake air is smaller as the temperature of said engine sensed by said temperature sensor means is lower.

4,987,872

PROCESS AND DEVICE FOR MONITORING A SET VALUE INDICATOR OF A DRIVE MOTOR OF A MOTOR VEHICLE

Helmut Geselle, Backnang, and Harald Bühren, Bühl, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

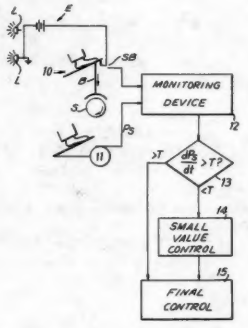
PCT No. PCT/DE88/00714, § 371 Date Aug. 10, 1989, § 102(e) Date Aug. 10, 1989, PCT Pub. No. WO89/05907, PCT Pub. Date Jun. 29, 1989

PCT Filed Nov. 17, 1988, Ser. No. 397,492

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743308

Int. Cl.[5] F02D *41/22*

U.S. Cl. 123—396 **10 Claims**



1. A monitoring process for a drive motor of a motor vehicle having a motor drive output set value indicator and a brake comprising the steps of:

(a) generating a brake actuation signal when said brake is activated;

(b) producing a set value signal from said motor drive output set value indicator;

(c) differentiating said set value signal to form a differentiated set value signal;

(d) testing whether said differentiated set value signal is quantitatively greater than a threshold value;

(e) reducing drive motor output of said drive motor unless said differentiated set value signal is greater than said threshold value and said brake actuation signal is being generated; and

(f) operating said drive motor normally if said differentiated set value signal is positive and greater than said threshold value and said brake actuation signal is being generated.

4,987,873

METHOD FOR THE DYNAMIC CORRECTION OF THE IGNITION POINT OF AN INTERNAL COMBUSTION ENGINE

Jürgen Schenk, Albershausen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed Sep. 26, 1989, Ser. No. 412,481

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1988, 3832629

Int. Cl.[5] F02P *5/04, 5/06, 5/14*

U.S. Cl. 123—418 **3 Claims**

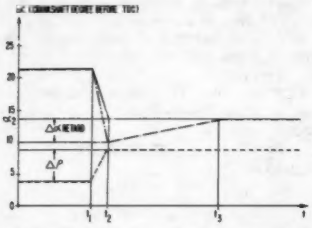
1. Method for dynamic corrections of an ignition point of an internal combustion engine, comprising the steps of:

providing a characteristic-diagram ignition of a function of intake tube pressure, intake air temperature and engine speed,

superimposing within a selectable time on an instantaneously valid point of the characteristic-diagram ignition a correction ignition point acting in a retard direction after a

predetermined intake tube pressure change has been exceeded, and

adjusting the correction ignition point within a freely select-



able time in an advance direction to the valid characteristic-diagram ignition point,

wherein the correction ignition point is a function of intake air temperature.

4,987,874

CONTROL SYSTEM FOR CONTROLLING SPARK TIMING OF ENGINE

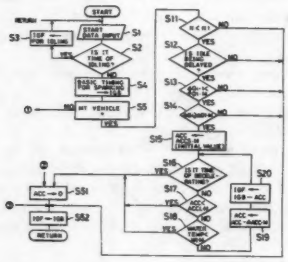
Kenji Katayama; Tatsuji Ikeda; Toshio Takeda, and Tomoichirou Shimada, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

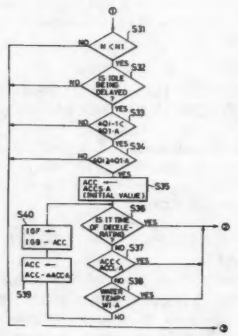
Filed May 22, 1990, Ser. No. 526,706

Claims priority, application Japan, May 25, 1989, 1-132429

Int. Cl.[5] F02P *5/15*

U.S. Cl. 123—422 **14 Claims**





1. A control system for controlling the timing for sparking the engine by retarding spark timing in a predetermined amount at the time of acclerating, comprising:

a judgement means for judging the presence or absence of disposition of a torque converter in a driving system of the engine; and

a retarding-amount altering means for altering an amount for retarding the spark timing at the time of accelerating so as to be greater when the presence of disposition of the torque converter is judged by the judgement means than when the absence of disposition of the torque converter is judged by the judgment means.

4,987,875

FUEL INJECTION PUMP FOR SUPPLYING THE COMBUSTION CHAMBERS OF INTERNAL COMBUSTION ENGINES INTENDED FOR VEHICLE OPERATION

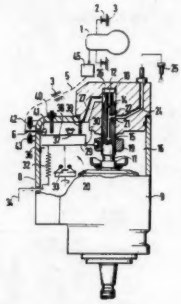
Gerald Hofer, Weissach-Flacht; Helmut Laufer, Gerlingen, and Max Staubel, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 5, 1986, Ser. No. 938,683

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1986, 3605824

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—449 **37 Claims**



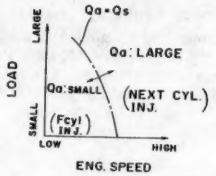
1. A fuel injection pump for supplying combustion chambers of internal combustion ingines intended for vehicle operation, having a fuel supply quantity adjusting device **(19)** adjustable in accorfance with operating parameters of the engine by means of a primary fuel quantity regulating device **(20)** and further adjustable by means of a secondary adjusting device **(41)** responsive to an anti-bucking signal, said secondary adjusting device **(41)** being adapted to counteract bucking by varying a fuel supply quantity, said anti-bucking signal being selectively formed based upon occurrence of at least one vehicular operating phenomena, said phenomena being collectively known as bucking, characterized in that the secondary adjusting device **(41)** comprises an actuating means **(6)** to which said anti-bucking signal is provided, which actuating means operates a fuel quantity setting means **(38)** to vary a basic setting of the fuel supply quantity of the fuel injection pump by at least a predetermined amount, and oppositely disposed adjustable stop means **(42, 43)** which limit travel of said adjusting device in a direction of a lesser or greater fuel injection quantity upon the appearance of bucking that accelerates or decelerates the vehicle according to a direction of the movement of said adjusting device, thereby determining said predetermined amount of said basic setting of said fuel supply quantity adjusting device.

4,987,876

FUEL INJECTION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Kunitomo Minamitani; Tetsuro Takaba, both of Kure; Terufumi Yamashita, Aki, and Toshihide Nishikawa, Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 10, 1989, Ser. No. 377,411
Claims priority, application Japan, Jul. 11, 1988, 63-172961
Int. Cl.[5] F02D *41/34, 41/18*
U.S. Cl. 123—492 **2 Claims**



1. A fuel injection system for a multi-cylinder internal combustion engine having a plurality of independent intake passages communicating with combustion chambers of respective cylinders, said system comprising:

fuel injection means securely mounted in respective intake passages;

means for detecting an amount of intake air to be led into each combustion chamber;

means for detecting a present stroke timing of each cylinder;

means for detecting engine speed;

control means for outputting a signal to said fuel injection means so that a predetermined timing on the basis of values detected by said respective detecting means, said control means comprising:

means for setting an injection timing of fuel to be injected into each cylinder so that an injection start timing is altered in compliance with driving conditions of the engine; and

means for setting an amount of fuel to be injected into each cylinder on the basis of at least the amount of intake air and the engine speed, said amount of intake air being detected at a timing which is altered in compliance with said injection start timing to be set by said fuel injection timing setting means ,said timing for detecting said amount of intake air being close to said injection start timing, said means for setting the fuel injection timing comprising discrimination means for discriminating the amount of intake air led into each combustion chamber so that the injection start timing is altered in compliance with the amount of intake air in a manner such that when the amount of intake air is small, the injection start timing is set substantially at the beginning of the intake stroke of a target cylinder, and as the amount of intake air becomes large, the injection start timing is gradually advanced from said timing.

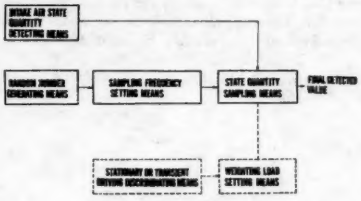
4,987,877

METHOD AND APPARATUS FOR DETECTING INTAKE AIR STATE QUANTITY IN AN INTERNAL COMBUSTION ENGINE

Shinpei Nakaniwa, Isesaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Isesaki, Japan

Filed Mar. 13, 1990, Ser. No. 492,836
Claims priority, application Japan, Mar. 13, 1989, 1-57922
Int. Cl.[5] F02D *41/18;* G01N *1/22*
U.S. Cl. 123—494 **11 Claims**

1. A method for detecting an intake air state quantity in an internal combustion engine, which comprises sampling at every predetermined time a detected value of an intake air state quantity participating in the quantity of sucked air in the internal combustion engine, wherein a random number is generated


INTAKE AIR STATE QUANTITY DETECTING MEANS
RANDOM NUMBER GENERATING MEANS
SAMPLING FREQUENCY SETTING MEANS
STATE QUANTITY SAMPLING MEANS
FINAL DETECTED VALUE
STATIONARY OR TRANSIENT DRIVING DISCRIMINATING MEANS
WEIGHTING LOAD SETTING MEANS

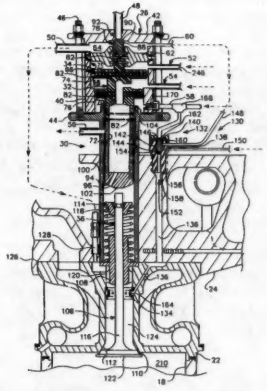
and the time of the sampling frequency is variably set based on the generated random number.

4,987,878

FUEL INJECTION SYSTEM

Jerome V. Johnson, 3440 Guildfore Ct. SE., Port Orchard, Wash. 98366

Filed Jun. 21, 1989, Ser. No. 369,291
Int. Cl.[5] F02M *23/00, 59/00;* F17D *3/01;* B05B *7/26*
U.S. Cl. 123—531 **9 Claims**



1. A fuel injection system for injecting fuel into a combustion chamber, the system comprising:

an injector, the injector including:

(a) a mixing chamber;

(b) a valve means for selectively admitting contents in said mixing chamber to the combustion chamber;

(c) a pneumatic control means for opening and closing said valve means;

(d) means for supplying fuel to said mixing chamber and for supplying a pressurized vapor to said pneumatic control means and to said mixing chamber such that when said pneumatic control means opens said valve means, the pressurized vapor admitted to the mixing chamber blows the fuel into the combustion chamber; and

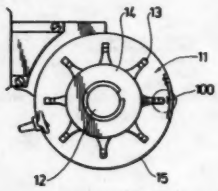
(e) means for regulating fuel flow into said mixing chamber, said regulating means comprising a pneumatic piston valve having a plunger portion that seats in a fuel passageway upstream from said mixing chamber such that pressurized vapor admitted to said pneumatic piston lifts said plunger portion out of the fuel passageway to admit a predetermined quantity of fuel into said mixing chamber.

4,987,879

IGNITION DISTRIBUTOR HAVING A MAGNETIC PICK-UP DEVICE INCLUDING A MAGNETORESISTOR

Guey-Fa Chi, Hsinchu; Duen-Jen Cheng, Kaohsiung, and Ying-Cheun Yeh, Hsinchu, all of Taiwan, assignors to Industrial Technology Research Institute, Hsinchu, Taiwan

Filed May 4, 1990, Ser. No. 520,107
Int. Cl.[5] F02P 7/067; H01L 43/08
U.S. Cl. 123—617 4 Claims



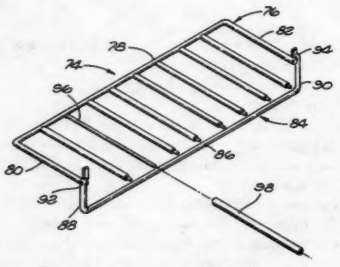
1. An ignition distributor comprising a housing, a distributor shaft rotatably mounted therein, an armature connected to said distributor shaft and having a predetermined number of teeth equally spaced therearound, and a magnetic pick-up device fixed to an inner face of said housing facing said teeth of said armature, said magnetic pick-up device producing a voltage pulse when said distributor shaft is rotated and each of said teeth of said armature passes said magnetic pick-up device for closing and opening a primary ignition circuit of an ignition coil which is electrically connected to said magnetic pick-up device, wherein the improvements comprise said magnetic pick-up device including a magnetoresistor and a permanent magnetic plate attached to said magnetoresistor, said magnetoresistor being electrically connected in series with said primary ignition of said ignition coil, and having a current flowing therethrough in a first direction, said permanent magnetic plate applying to said magnetoresistor a magnetic field in a second direction perpendicular to said first direction.

4,987,880

GRILL GRATE COVER

Edilberto M. Zabala, 13723 Arapaho St., Fontana, Calif. 92336

Filed May 21, 1990, Ser. No. 526,376
Int. Cl.[5] A47J 37/00; F24B 3/00
U.S. Cl. 126—25 R 16 Claims



1. A grill grate and cover comprising:

a grill grate having a frame and having grate bars, said grate frame being formed of first and second grate frame portions, said first and second grate frame portions being hinged together so that in a first position they are in the same plane and in a second position said grate frame portions are at an angle with respect to each other;

each of said grate bars having a first and second end, each of said grate bars being attached to said frame at its second end, said first end of said grate bars being free of said frame; and

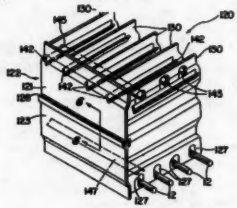
a plurality of tubular grate bar covers on a corresponding plurality of said grate bars so that said tubular grate bar covers can be installed on said first end of said grate bars and removed therefrom, each said grate bar cover being shorter than the grate bar on which it is installed and being heat-resistant and substantially non-toxic.

4,987,881

FUEL BURNING FURNACE

Rajendra K. Narang, 1525 Bonnie Rd., Macedonia, Ohio 44056

Division of Ser. No. 366,262, Jun. 12, 1989, Pat. No. 4,922,890, which is a continuation of Ser. No. 428,542, Sep. 30, 1982, abandoned. This application Mar. 16, 1990, Ser. No. 494,589
Int. Cl.[5] F24H 3/02
U.S. Cl. 126—110 R 39 Claims



1. A furnace comprising a plurality of longitudinally extending burners for use in burning fuel to form hot combustion gases which rise upwardly along the length of said burners, and a plurality of generally upright heat exchange enclosures having sidewalls which form upwardly extending combustion gas chambers for receiving hot combustion gases from each of said burners, said sidewalls of said heat exchange enclosures being disposed in a side-by-side relationship with space between outer side surfaces of said sidewalls to form a plurality of spaced apart flow paths for air to be heated by exposure to outer side surfaces of said sidewalls, each of said burners being partially enclosed by each of said heat exchange enclosures to enable each of said heat exchange enclosures to conduct hot combustion gases upwardly from each of said burners to heat said sidewalls of each of said heat exchange enclosures, each of said burners having a longitudinal central axis which extends transversely to the sidewalls of said heat exchange enclosures and extends through each of the combustion gas chambers.

4,987,882

ROOF MOUNTED KITCHEN HOOD GREASE EXHAUST BLOWERS

Arnold S. Kaufman, Studio City, Calif., assignor to Renco Systems, Inc., Glendale, Calif.

Filed Feb. 5, 1990, Ser. No. 475,223
Int. Cl.[5] F24C 15/20
U.S. Cl. 126—299 D 9 Claims

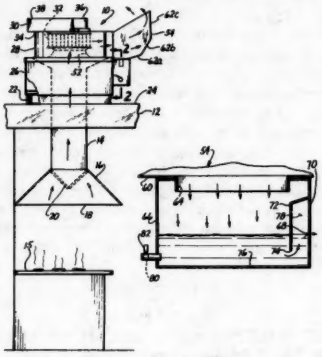
1. A kitchen grease exhaust blower for roof mounting, comprising:

a blower housing for mounting in communication with an exhaust duct;

an air discharge scoop fixed to said blower housing;

a motor driven blower wheel supported in said housing for

drawing air from the exhaust duct and exhausting the air through said scoop; and



container means for collecting fluid from said scoop including flotation separator means for eliminating water while retaining lighter-than-water fluids in said container means.

4,987,883

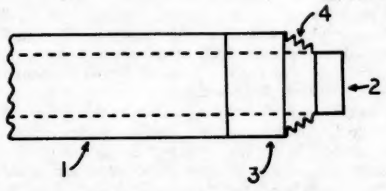
EVACUATED SOLAR COLLECTOR TUBE

Albert W. Watkins, 15285 Monte Rosa Dr., Granger, Ind. 46530, and Ivan W. Watkins, 16782 269th St., Cold Spring, Minn. 56320

Filed Oct. 14, 1988, Ser. No. 258,139

Int. Cl.[5] F24J *2/24*

U.S. Cl. 126—443 **7 Claims**



1. An evacuated tube solar energy collector and heat exchanger having an outer tube and an inner tube, said inner and said outer tubes substantially separated by a partial vacuum, and a first interconnection means for interconnecting said inner and said outer tubes while maintaining a vacuum tight seal therebetween, wherein said first interconnection means comprises a second portion which is sufficiently resilient to maintain said vacuum tight seal between said inner tube and said outer tube when said inner tube expands and contracts differently from said outer tube, and wherein said first interconnection means comprises a first portion composed primarily of a refractory material which is resistant to thermal shock associated with relatively significantly concentrated solar energy instantaneously impinging upon said collector while simultaneously conducting no significant thermal energy from said inner tube to said outer tube.

4,987,884

ELECTRONIC ENDOSCOPE

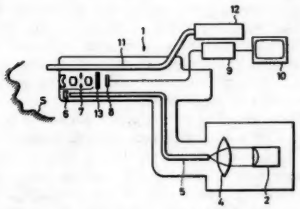
Kimihiko Nishioka, Hachiouji; Hisao Ogiu, Oume, and Tatsuo Nagasaki, Musashino, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 102,249, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 813,774, Dec. 27, 1985, abandoned. This application May 16, 1989, Ser. No. 352,627

Claims priority, application Japan, Dec. 28, 1984, 59-198856

Int. Cl.[5] A61B *1/06*

U.S. Cl. 128—6 **6 Claims**



1. An electronic endoscope comprising:

illuminating means for radiating light toward an object, said illuminating means comprising:

a light source for generating said light,

at least one infrared ray removing filter means having a first spectral transmittance for filtering light having a wavelength of 690 to 950 nm, and

means for guiding said filtered light toward said object; and

image pickup means for imaging light reflected from said object, said image pickup means comprising:

objective lens unit means for focussing said light, and

heat ray absorbing filter means having a second spectral transmittance for filtering light having a wavelength of 950 to 1100 nm so that, as a whole, said infrared ray removing filter means and said heat ray absorbing filter means remove infrared rays and YAG laser beams ranging in wavelength from 690 to 1100 nm.

4,987,885

LUMBAR TRACTION APPARATUS

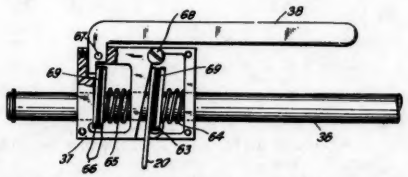
Ludwig Shtabholz, Tel-Aviv, Israel, assignor to Meditrac LTD, Tel-Aviv, Israel

Filed Aug. 2, 1988, Ser. No. 227,142

Claims priority, application Israel, Dec. 2, 1987, 84695

Int. Cl.[5] A61H *1/02*

U.S. Cl. 128—75 **14 Claims**



1. A lumbar traction apparatus comprising in combination:

a pair of U-shaped supports each including an upper and a lower support each constructed from plastic bars cast in polyurethane foam which serves as padding;

each of the supports provided with a belt assembly for engaging it about a patient and each of the supports having a handle positionable at the front middle of the patient;

each of said belt assemblies provided with tightening means for tightening it and operable by moving its associated handle;

a pair of laterally spaced traction assemblies each spanning the patient's lumbar region between said supports, with each of the traction assemblies provided with a vertical rod having an upper end connect to the upper support;

each of said traction assemblies provided with a spring connected between its associated rod and the upper support, and each of the springs provided with a gauge for measuring traction;

each of the rods having a lower end connected by adjusting means to the lower support;

each of the adjusting means comprising a first set of plurality of thin metal caged stacked plates, a spring, a lever organized to engage said first plurality of thin metal caged stacked plates about its associated rod, with the stacked plates retained by said spring that abuts against the lower support, whereby when said levers are engaged the stacked plates causes its associated rod to be raised relative to the lower support thus increasing the distance between the upper support and lower support thus causing traction of the patient;

each of the adjusting means provided with a second set of plurality of thin metal caged stacked plates and a release plate projecting out of the lower support, each of said release plates is connected to its respective plurality of thin stacked plates to engage or disengage them from its associated rod;

a bar spanning across the patient's back between said rods with a lordosis pad connected to the bar, and pressing means for pressing the lordosis pad against the patient's back to apply localized force thereagainst.

4,987,886

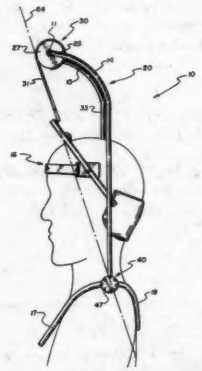
TRACTION APPARATUS

Philip McDonald, 3326 Elgin Dr., and Newel Kimball, 204 Browning Ave. #5, both of, Salt Lake City, Utah 84109

Filed Nov. 9, 1989, Ser. No. 433,751

Int. Cl.[5] A61H *1/02*; A61F *5/08, 5/04*

U.S. Cl. 128—75 **10 Claims**



1. Traction apparatus comprising:

frame assembly means having a first portion, a second portion, and an attachment means,

said attachment means attaching said first portion to said second portion in an adjustable relationship,

said first portion of said frame having two side members which extend above the user's head, and an apex which is located remotely from said attachment means and which includes means for attaching at least a portion of a traction force generating means thereto, said traction force generating means including head gear means and spring assembly means, said spring assembly means being attached to said apex and said head gear means being attachable to a user's head, said spring assembly means including a single attachment element which is attachable to said head gear means, and

said second portion of said frame assembly including means for securing said second portion in fixed relationship relative to a user,

whereby, when a user is correctly positioned relative to said second portion of said frame, said attachment means is located at the user's neck, above the user's shoulders and below the user's head, and allows adjustment of said first portion of said frame to any desired location relative to said second portion to orient the apex at the desired position above the user's head, and whereby, the connection of said attachment element between said spring assembly means and said head gear means functions to allow movement of the user's head relative to said frame for therapeutic purposes, without affecting the magnitude of the force applied to the head by the traction force generating means.

4,987,887

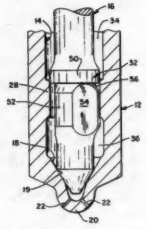
FUEL INJECTOR METHOD AND APPARATUS

William W. Kelly, Granby, Conn., assignor to Stanadyne Automotive Corp., Windsor, Conn.

Continuation-in-part of Ser. No. 500,714, Mar. 28, 1990. This application Aug. 3, 1990, Ser. No. 562,617

Int. Cl.[5] F02M *41/00*

U.S. Cl. 123—467 **18 Claims**



1. A fuel injector comprising a nozzle body with an elongated valve bore, an annular valve seat and longitudinally spaced, coaxial, upper valve guide and lower valve ring above the valve seat; an elongated nozzle needle valve in the valve bore having longitudinally spaced, coaxial, upper guide and lower ring which cooperate with the upper valve guide and lower valve ring respectively of the nozzle body to provide axial movement of the needle valve within the valve bore between a lower closed position in engagement with the valve seat and an upper fully open position with a predetermined maximum lift; the nozzle body having hole means connected to the valve bore below the valve seat for injection of fuel; the nozzle body providing an upper fuel chamber surrounding the needle valve between the upper valve guide and lower valve ring and a lower fuel chamber surrounding the needle valve between the lower valve ring and valve seat; two stage valve closure spring means biasing the needle valve downwardly into engagement with the valve seat, including first stage spring means holding the needle valve in its closed position and biasing the needle valve downwardly as it is lifted upwardly from its closed to its fully open position and second stage spring means biasing the needle valve downwardly as it is lifted upwardly from a predetermined intermediate position with a predetermined intermediate lift to its fully open position; the upper guide of the needle valve having a greater diameter than the valve seat to provide a differential area for hydraulically opening the needle valve against the bias of the valve closure spring means; the upper fuel chamber being connected to receive periodic high pressure pulses of fuel for opening the needle valve against the bias of the spring means and for supplying fuel for fuel injection through the hole

means; the lower valve ring forming an outer metering ring with an internal, annular metering surface with an upper metering edge; the lower ring of the needle valve forming an inner metering ring with an external annular, metering surface with a lower metering edge; the inner metering ring, with the needle valve in its closed position, being received within the outer metering ring with the inner ring metering edge below the outer ring metering edge by a predetermined axial overlap substantially less than said predetermined maximum lift and slightly more than said predetermined intermediate lift and with a predetermined annular clearance between the inner and outer metering surfaces providing a metering passageway to regulate fuel flow between the upper and lower fuel chambers during an initial increment of upward movement of the needle valve from its closed position and to its said intermediate position and to regulate the pressure in the lower fuel chamber during the corresponding last increment of downward movement of the needle valve.

4,987,889

METHOD OF CONTROLLING FUEL SUPPLY TO ENGINE BY PREDICTION CALCULATION

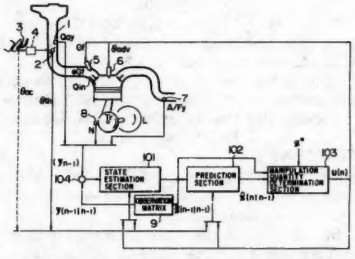
Motohisa Funabashi, Sagamihara; Teruji Sekozawa, Kawasaki; Makoto Shioya, Tokyo; Mikihiko Onari, Kokubunji; Shinsuke Takahashi, Yokohama, and Gohki Okazaki, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,970

Claims priority, application Japan, Apr. 8, 1987, 62-84737

Int. Cl.[5] F02D *41/10, 41/12, 43/00*

U.S. Cl. 123—488 **9 Claims**



1. A method for determining control variables of an engine of an automobile on the basis of engine operating parameters and a target air-fuel ratio, said method comprising the steps of:

(a) measuring a plurality of parameters representing engine operating conditions including an intake air flow at the present state of the engine;

(b) estimating a plurality of unmeasured parameters representing engine operating conditions at the present state of the engine on the basis of said measured parameters;

(c) predicting engine operating conditions at a coming state of the engine on the basis of the measured parameters and the estimated parameters;

(d) determining control variables at the coming state of the engine on the basis of the predicted engine operating conditions; and

(e) said estimating step including a step for estimating said unmeasured parameters on the basis of difference values between the measured parameters and the corresponding estimated parameters.

4,987,889

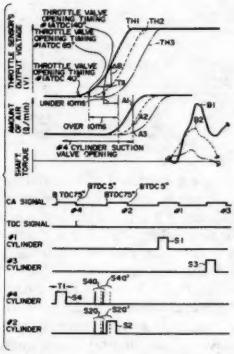
METHOD FOR CONTROLLING FUEL AT AN ACCELERATION TIME OF AN ELECTRONICALLY-CONTROLLED FUEL ENGINE

Hirokatsu Fujita, Kyoto; Kimito Kashiwabara, Kameoka, and Yoshiaki Kanno, Hiemji, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki, Tokyo and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Jan. 23, 1990, Ser. No. 468,629

Int. Cl.[5] F02M *51/00*

U.S. Cl. 123—492 **4 Claims**



1. A method of controlling the supply of fuel at a time of accelerating an electronically controlled fuel injection multiple cylinder engine comprising:

(a) determining the arrival of a cylinder at a suction stroke at each generation of a signal corresponding to a first predetermined crank angle position of each cylinder and injecting, into that cylinder at the suction stroke, a first amount of fuel which is computed by a first technique based on a parameter value and a number of engine rotations representing an engine load

(b) determining the arrival of a cylinder at a suction stroke for asynchronous injection, at each generation of a second crank angle position signal which is nearer to a top dead center than the first predetermined crank angle position signal;

(c) detecting a throttle valve opening for each predetermined time and computing a throttle valve opening variation; and

(d) upon determining the variation as being greater than a predetermined value, injecting a second amount of fuel corresponding to that variation into the cylinder which has been determined by the second crank angle position signal as being at a suction stroke.

4,987,890

FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Hatsuo Nagaishi, Zushi, Japan, assignor to Nissan Motor Co., Ltd., Japan

Division of Ser. No. 239,830, Nov. 3, 1988, Pat. No. 4,852,538, which is a continuation of Ser. No. 923,983, Oct. 28, 1986, abandoned. This application May 5, 1989, Ser. No. 348,225

Claims priority, application Japan, Oct. 29, 1985, 60-243605; Jan. 9, 1986, 61-2810

The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.

Int. Cl.[5] F02D *41/30*

U.S. Cl. 123—492 **15 Claims**

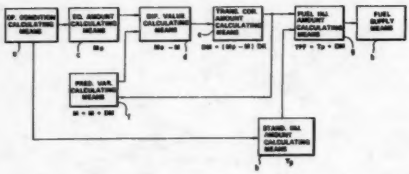
1. A fuel injection control system for an internal combustion engine, comprising:

means for detecting operating condition of the engine;

means for calculating a standard injection amount in accordance with the engine operating condition;

means for calculating an equilibrium amount of adhering and floating fuel in an intake system of the engine, in a steady state of engine operation, in accordance with the engine operating condition;

means for calculating a difference value between said equilibrium amount of the adhering and floating fuel in the intake system and a predicted variable of amount of the adhering and floating fuel in the intake system at a predetermined point of time, said difference value calculating



means including means for calculating said predicted variable in timed relation to engine speed of the engine;

means for calculating a transient correction amount in accordance with said difference value and a correction coefficient which is previously set in accordance with operating condition of the engine;

means for calculating a fuel injection amount in accordance with said standard injection amount and said transient correction amount and outputting an injection signal representative of said fuel injection amount; and

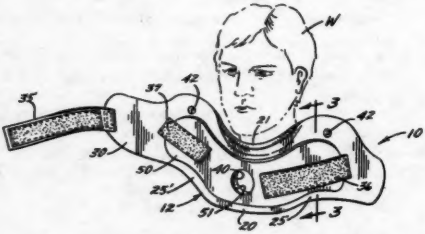
means for supplying fuel to the engine in accordance with said injection signal.

4,987,891

EMERGENCY CERVICAL COLLAR

John F. Gaylord, Jr., Matthews, and Susan L. Dean, Charlotte, both of N.C., assignors to Medical Specialties, Inc., Charlotte, N.C.

Filed Dec. 30, 1988, Ser. No. 292,416
Int. Cl.[5] A61F 5/04
U.S. Cl. 128—87 B **9 Claims**



1. A low cost cervical collar adapted to encircle a wearer's neck to support the head and neck against movement in both lateral directions as well as in the forward and rear plane, and comprising

a generally flat, unitary body member having a sufficient longitudinal length and flexibility to permit the same to substantially encircle the wearer's neck in use, said body member being composed of a foam plastic material of substantially uniform thickness throughout and comprising a medical portion and opposite wing portions, with said medial portion adapted to extend between the chin and sternum of the wearer in use and having an upper edge portion which is inclined outwardly from the plane of the remainder of the body member to define a chin engaging support, and with said wing portions each having a sufficient lateral width so as to be adapted to overlie the ears with the wearer in use and thereby provide substantial lateral stability to the head of the wearer, at least one of said wing portions further comprising an outer end portion having a lateral width less than that of the remainder of said one wing portion, and with said end portion being adapted to overlie the back of the neck of the wearer in use,

a one-piece, relatively thin, solid plastic sheet attached to said body member and overlying at least a substantial portion of said medial portion and each of said wing portions, and such that said plastic sheet provides additional resilience and strength to the cervical collar, and

fastening means mounted to said body member for releasably securing said body member in encircling relation about the neck of the wearer, said fastening means comprising a longitudinally extending flexible strap fixed to the outer end of one of said wing portions, and a second strap fixed to the opposite wing portion, and wherein one of said first and second straps mounts hook type releasable attachment means and the other of said first and second straps mounts mating loop type releasable attachment means, and wherein the entire second strap overlies said body member and at least a portion the other of said first and second straps mounts mating loop type releasable attachment means, and wherein the entire second strap overlies said body member and at least a portion of said plastic sheet, and with said second strap being secured to said plastic sheet and said body member by stitching which extends through said plastic sheet and said body member, and such that said stitching also serves to secure said plastic sheet to said body member.

4,987,892

SPINAL FIXATION DEVICE

Martin H. Krag, and Malcolm H. Pope, both of Pfizer Inc., 235 E. 42nd St., New York, N.Y. 10017

Continuation of Ser. No. 333,855, Apr. 4, 1989, abandoned, and a continuation of Ser. No. 8,693, Jan. 30, 1987, abandoned. This application Dec. 21, 1989, Ser. No. 456,085
Int. Cl.[5] A61F 5/04
U.S. Cl. 606—61 **9 Claims**

1. A device for internalized spinal fixation having three-dimensional adjustability and requiring no violation of the spinal canal, said device comprising:

(a) a first and a second bone screw adapted to be screwed at least into a first and a second pedicle, respectively, of two vertebrae along one side of a spinal column and for anchoring the device posteriorly with respect to the patient's body in the pedicle area of the spine, said first bone screw to be screwed at least into a pedicle of a first vertebra and said second bone screw to be screwed at least into a pedicle of a second vertebra,

(b) a rigid stabilizing rod,

(c) a pair of articulating clamps slidably and rotatably positionable at opposite ends of said stabilizing rod, each of said clamps having a securing means for fixedly but releasably attaching one of said bone screws to the stabilizing rod, but without requiring said bone screws to be parallel to each other, wherein said securing means comprises radially arranged teeth located on the proximal surface of a bone screw and corresponding intermeshable radially arranged teeth located on a surface of an articulating clamp, and

(d) locking means to lock each bone screw to the articulating clamp to which it is to be attached.

4,987,893

CONFORMABLE BANDAGE AND COATING MATERIAL

Ann B. Salamone; Joseph C. Salamone, both of Boca Raton, Fla., and Alfred P. Olson, Center Barnstead, N.H., assignors to Rochal Industries, Inc., Boca Raton, Fla.

Continuation-in-part of Ser. No. 256,651, Oct. 12, 1988, abandoned. This application Oct. 4, 1989, Ser. No. 416,924

Int. Cl.[5] A61L *13/00*; A61F *13/00, 15/00*

U.S. Cl. 128—156 23 Claims

18. A liquid polymer containing coating material comprising from 1 to 40 wt. % siloxane-containing polymer, 60 to 99 wt. % volatile polydimethylsiloxane, said coating material being substantially non-stinging, quick-drying and film forming at room temperature to form an adherent comformable moisture vapor permeable coating directly on a surface.

4,987,894

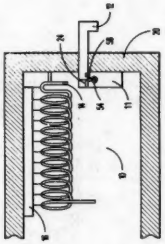
ANESTHETIC EVACUATION REGULATOR

John D. Kight, P.O. Box 941, Westwood, Calif. 96137

Filed Apr. 6, 1989, Ser. No. 333,918

Int. Cl.[5] A62B *9/02*

U.S. Cl. 128—205.24 10 Claims



1. A new and improved anesthetic evacuation regulator adapted for connection with a pop-off valve of an anesthesia machine, said regulator comprising:

a housing;

a ducted motor driven fan in said housing for producing a vacuum;

a vacuum port on said housing;

a flexible hose connectable to said vacuum port for distributing the vacuum to a remote location;

an atmospheric equalizer connected to said hose for controlling the amount of vacuum which is applied to the pop-off valve of an anesthetic machine;

and

said atmospheric equalizer including means for mixing the exhaust gas from the pop-off valve with ambient air.

4,987,895

TRACHEAL TUBE

Henry J. Heimlich, 17 Elmhurst Pl., Cincinnati, Ohio 45208

Continuation-in-part of Ser. No. 915,699, Oct. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 715,384, Mar. 25, 1985, abandoned. This application Jun. 22, 1988, Ser. No. 209,880

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—207.14 8 Claims

1. A tracheal tube comprising at least two tubular longitudinally spaced support sections which are sufficiently rigid to resist collapse in the radial direction in use,

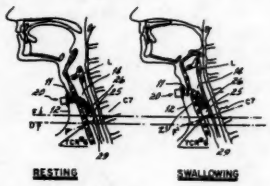
a tubular collapsible section joining and extending between the respective support sections, said collapsible section being made of pliant foldable material which is easily collapsible and re-extendable in use in its axial direction, said collapsible section adapted to collapse and re-extend axially in response to movement of the trachea in a direction which tends to shorten and extend said tube,

the support sections being connected to one another only through the collapsible section and providing radial support for the collapsible section where the latter joins the support sections,

said tube having an inner end portion which in use engages and bears against the trachea of a patient, and an outer portion which in use extends externally of the patient,

means for securing said outer portion in fixed position externally of the patient,

the axial collapsibility of the collapsible section between said support sections being such that it is adapted to fold and unfold between the support sections as the inner end



portion of the tube moves with the trachea more easily than the outer portion and inner end portion of the tube can move relative to the positions at which they engage the patient,

said tube thereby shortening and lengthening so that any change in the axial distance between said outer portion and said inner end portion is accommodated by folding or unfolding of the collapsible section and essentially no movement relative to the trachea occurs where the inner end portion of the tube engages and bears against the trachea.

4,987,896

APPARATUS FOR INCREASING THE ACTIVITY OF THE HUMAN BRAIN

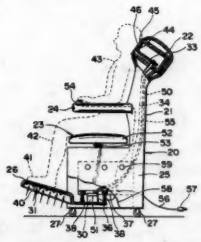
Yoshiro Nakamatsu, 1-10-309, Minami Aoyama 5-chome, Minato-ku, Tokyo, Japan

Continuation of Ser. No. 188,200, Apr. 28, 1988, abandoned, which is a continuation of Ser. No. 608,918, May 10, 1984, abandoned, which is a continuation of Ser. No. 317,205, Nov. 2, 1981, abandoned. This application Aug. 17, 1989, Ser. No. 395,290

Claims priority, application Japan, Mar. 28, 1981, 56-44719; Jul. 30, 1981, 56-118455; Aug. 6, 1981, 56-122393; Aug. 6, 1981, 56-122394; Aug. 6, 1981, 56-122395; Aug. 6, 1981, 56-122396

Int. Cl.[5] A61F *7/00*

U.S. Cl. 128—399 10 Claims



1. An apparatus for effecting a physiological change in a person's body comprising a chair having a head rest and a foot rest, a cooling means mounted in said head rest of said chair for cooling the head of a person seated in said chair by direct contact of the head of the person with said head rest, and warming means mounted in said foot rest of said chair for simultaneously warming the soles of the feet of said person

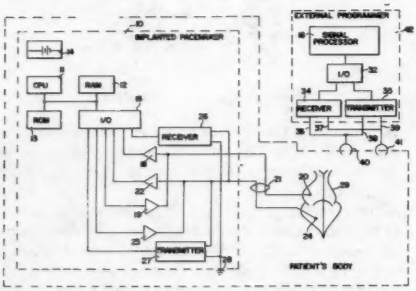
sitting in said chair by direct contact of the feet of said person with said foot rest.

4,987,897

BODY BUS MEDICAL DEVICE COMMUNICATION SYSTEM

Hermann D. Funke, Bonn, Fed. Rep. of Germany, assignor to Medtronic, Inc., Minneapolis, Minn.

Filed Sep. 18, 1989, Ser. No. 408,811
Int. Cl.[5] A61N 1/00
U.S. Cl. 128—419 PG 31 Claims



1. In a system for monitoring a condition of a living body and/or providing one or more therapy regimens to the body comprising two or more discrete medical devices, at least one of which is implanted into the living body, the improvement for providing bidirectional exchange of information between said medical devices comprising:

means associated with at least one of said medical devices for providing a first information signal representing a condition of the device and/or the living body;

means for transforming said first information signal into a modulated medium frequency signal in the frequency range from 10 to 100 kHz;

means for applying said modulated medium frequency signal to the ion medium of the intra and extracellular body liquids for providing an electrolytic/galvanic coupling between said two or more medical devices whereby said signals are passed through said living body between said medical devices; and

means associated with at least the other of the two medical devices for receiving and demodulating said modulated medium frequency signal.

4,987,898

METHOD AND DEVICE FOR THE NON-INVASIVE MEASUREMENT OF PRESSURE

William Sones, New York, N.Y., assignor to Noninvasive Medical Incorporated, Hackensack, N.J.

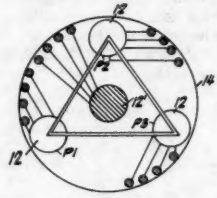
Filed Jan. 17, 1989, Ser. No. 297,308
Int. Cl.[5] A61B 3/16
U.S. Cl. 128—645 17 Claims

1. A method of non-invasive detection of pressure within a vessel having an elastic wall portion, comprising the steps of:

(a) placing a coplanar triangular array of three pressure transducers into contact with the elastic wall portion;

(b) monitoring the pressure detected by said transducers;

(c) advancing said array against said elastic wall portion until the pressure sensed by three monitored transducers is equal; and



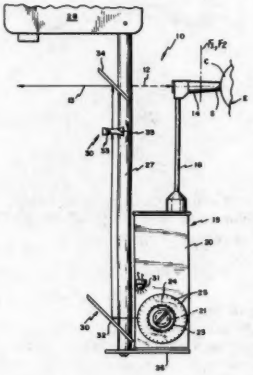
(d) generating a first signal indicating the pressure measured by said transducers when the pressure sensed by said three monitoring transducers is equal.

4,987,899

APPLANATION TONOMETER

Alan W. Brown, 4 Hartley Cir., Apt. 824, Owings Mills, Md. 21117

Filed Oct. 17, 1989, Ser. No. 422,476
Int. Cl.[5] A61B 3/16
U.S. Cl. 128—645 12 Claims



1. An applanation tonometer comprising a tonometer tip for contacting a surface of a cornea of an eye, means for moving the tonometer tip to applanate and vary the degree of applanation of the corneal surface, means for establishing an optical viewing axis along which the applanated corneal surface can be viewed, means for transforming the degree of applanation to an ocular pressure value, and means for displaying the ocular pressure value at a location at which it is visible when a user views along said optical viewing axis whereby both the applanated corneal surface and the ocular pressure value thereof can be viewed simultaneously.

4,987,900

APPARATUS FOR POSITIONING TRANSDUCER FOR BLOOD PRESSURE MONITOR

Joseph S. Eckerle, Redwood City, Calif., and Dean C. Winter, San Antonio, Tex., assignors to Colin Electronics Co., Ltd., Japan

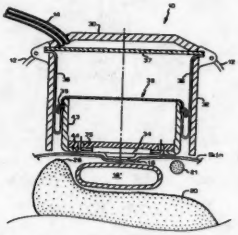
Continuation of Ser. No. 41,245, Apr. 21, 1987, abandoned. This application May 3, 1989, Ser. No. 349,937
Int. Cl.[5] A61B 5/02
U.S. Cl. 128—672 9 Claims

1. An apparatus for positioning a sensor over an artery of a patient to obtain a continuous measurement of the blood pressure in said artery, comprising:

a sensor, said sensor comprising a monocrystalline silicon substrate having an array of sensing elements thereon;

a transducer case adapted to be attached to the wrist of a patient at point where said artery overlies the radius bone and said artery lies between the prominence of said radius bone and the tendon of the flexor carpi radialis muscle;

a piston received in said case and movable therein, said piston having a lower face engagable with the surface of the skin overlying said artery at said point on said wrist;



a protrusion in said lower face of said piston, said protrusion defining a mounting platform to position said sensor attached thereto in a pressure-bearing relationship with the surface of the skin overlying said artery, said protrusion being offset by a predetermined distance from the lower face of said piston; and

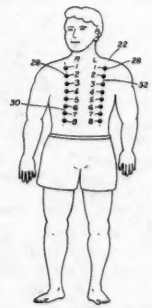
means for moving said piston with respect to said case to cause said sensor to bear sufficient pressure against said skin overlying said artery to be partially flattened.

4,987,901

METHOD AND APPARATUS FOR SELECTING A PHYSIOLOGICALLY STANDARDIZED SENSOR OF A MULTI-SENSOR ELECTROCARDIOGRAM SENSOR SET

Horst E. Kunig, R.D. #1, Box 577, Saltsburg, Pa. 15681

Filed Jun. 28, 1989, Ser. No. 373,227
Int. Cl.[5] A61B *5/0456, 5/0452*
U.S. Cl. 128—696 **18 Claims**



1. Electrocardiographic apparatus for selecting a desired number of physiologically standardized sensors of a plurality of electrocardiogram sensors for forming leads to allow diagnosis of cardiac performance of an individual, said apparatus including:

a plurality of electrocardiogram sensors for positioning on the individual and for sensing electrocardiogram waveforms indicative of cardiac functioning of the individual;

waveform measuring means coupled to receive the electrocardiogram waveforms sensed by each of the leads formed by the electrocardiogram sensors of the plurality of electrocardiogram sensors for measuring magnitudes of predetermined components of the electrocardiogram waveforms;

comparator means for comparing the magnitudes of the predetermined components of the electrocardiogram waveforms and for selecting the waveforms, and hence, the leads from which the electrocardiogram waveforms are sensed containing the predetermined components of the greatest magnitudes, said positions forming the leads on the individual corresponding to the physiologically standardized electrocardiogram sensor positions; and

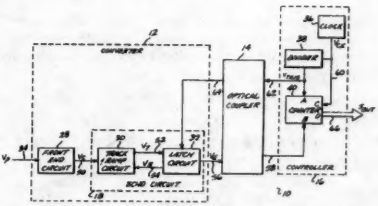
means for displaying said electrocardiogram waveforms selected by the comparator means.

4,987,902

APPARATUS FOR TRANSMITTING PATIENT PHYSIOLOGICAL SIGNALS

Charles A. Couche, Seattle, Wash., assignor to Physio-Control Corporation, Redmond, Wash.

Filed Dec. 30, 1988, Ser. No. 292,496
Int. Cl.[5] A61B *5/04*
U.S. Cl. 128—696 **26 Claims**



1. An apparatus for transmitting a patient physiological signal, the apparatus comprising:

(a) a converter including means for receiving a first signal and the patient physiological signal and for producing a second signal in response thereto, such that a time delay from receipt of said first signal to production of said second signal encodes said patient physiological signal;

(b) control means comprising means for producing said first signal, means for receiving said second signal, and means for determining an estimated time delay by measuring the time elapsed between the production of said first signal and receipt of said second signal, whereby the estimated time delay provides a measure of the patient physiological signal; and,

(c) optical coupler means coupled to the converter and to the control means such that said optical coupler means transmits said first signal from said control means to said converter and transmits said second signal from said converter to said control means.

4,987,903

METHOD AND APPARATUS FOR IDENTIFYING AND ALLEVIATING SEMANTIC MEMORY DEFICIENCIES

William Keppel, 11640 SW. Boones Ferry Rd., Portland, Oreg. 97219, and Kenneth R. Erickson, 21414 SW. Martinazzi Ave., Tualatin, Oreg. 97062

Filed Nov. 14, 1988, Ser. No. 271,164
Int. Cl.[5] A61B *5/04*
U.S. Cl. 128—732 **16 Claims**

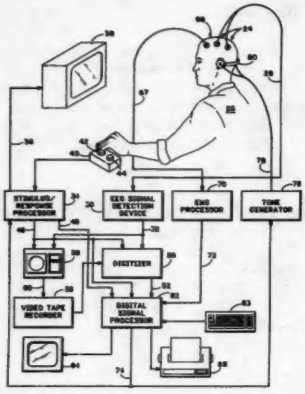
11. An apparatus for diagnosing Alzheimer's disease, comprising:

(a) detection means for detecting the electroencephalogram signal from the scalp of a subject to produce a signal representative of evoked response potentials;

(b) display means for displaying symbols to a subject in a predetermined manner;

(c) input means for receiving from the subject a signal repre-

sentative of whether the subject ascribes meaning to a given symbol; and



(d) measurement means for measuring the amplitude of the most positive peak of said evoked response potential signal during the 270–550 ms period following the display of a given symbol.

4,987,904

METHOD AND APPARATUS FOR BONE SIZE GAUGING

James T. Wilson, 1932 Tampa East Blvd., Tampa, Fla. 33619

Filed Mar. 22, 1990, Ser. No. 497,492
Int. Cl.[5] A61B *5/107*
U.S. Cl. 128—774 11 Claims

1. A device for gauging the size of a bone socket comprising:
a hemispherical member having a pole on its axis at the distal end and having a bore on its axis at its proximal end;
a handle releasably attached to the bore of the hemispherical member; and
a pressure responsive surface means on the hemispherical member for changing characteristics when brought in contact with a bone socket to be gauged.

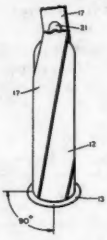
4,987,905

NO HANDS CONTRACEPTIVE DEVICE

Robert L. Broad, Jr., 2300 Brookwood Dr., SE, Decatur, Ala. 35601

Filed Jan. 23, 1989, Ser. No. 300,139
Int. Cl.[5] A61F *6/04*
U.S. Cl. 128—844 24 Claims

1. A contraceptive device, comprising
a. a condom having a rolled portion,
b. a pair of sheets positioned on opposite sides of the condom, said sheets being secured to each other around the edges thereof to form a package for the condom, and
c. a pair of strips each having one end rolled into the rolled portion of the condom and the other end thereof extending toward and being secured to the sheets at opposite edges thereof, said rolled portion and strips having sufficient give that when the package is torn into two parts and



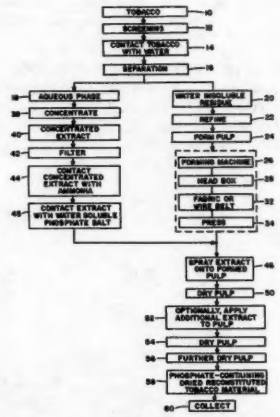
the two parts moved away from each other the condom can be pulled out of the package to an exposed position between said two parts without premature unrolling.

4,987,906

TOBACCO RECONSTITUTION PROCESS

Harvey J. Young, Advance, and Edward Bernasek, Winston-Salem, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Sep. 13, 1989, Ser. No. 406,637
Int. Cl.[5] A24B *15/24*
U.S. Cl. 131—297 15 Claims



1. A process for providing a reconstituted tobacco material, the process comprising the steps of:
(a) extracting components from tobacco material using a solvent having an aqueous character thereby providing (i) a solvent having extracted tobacco components therein, and (ii) a tobacco portion insoluble in the solvent;
(b) separating at least a portion of the solvent and extracted tobacco components therein from the insoluble tobacco portion; and then
(c) forming the insoluble tobacco portion into a predetermined shape;
(d) providing the portion of solvent and extracted components provided in step (b) at a pH of about 6 to about 8, and then contacting the solvent and extracted tobacco components with a water soluble phosphate salt; and
(e) contacting the insoluble tobacco portion of step (c) with the solvent and extracted tobacco components of step (d) to provide a phosphate-containing tobacco material.

4,987,907

CHEWING TOBACCO COMPOSITION AND PROCESS FOR PRODUCING SAME

John Townend, Lancaster, Pa., assignor to Helme Tobacco Company, Helmetta, N.J.

Filed Jun. 29, 1988, Ser. No. 212,877
Int. Cl.[5] A24B *15/28, 15/30*
U.S. Cl. 131—352 16 Claims

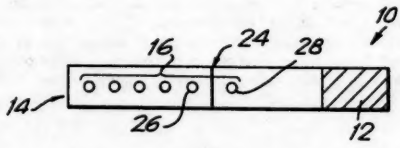
1. A method for making a chewing tobacco composition comprising the steps of:
preparing a casing solution composition comprising a casing solution and powdered cellulose pulp;
dipping cut tobacco into the casing solution composition; and
recovering a mixture of the casing solution composition and the cut tobacco.

4,987,908

THERMAL INDICATORS FOR SMOKING ARTICLES

F. Murphy Sprinkel, Glen Allen; Constance H. Morgan, Midlothian, and D. Bruce Losee, Jr., Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Jul. 18, 1989, Ser. No. 381,764
Int. Cl.[5] A24D *1/02;* A24C *5/38, 5/60*
U.S. Cl. 131—365 20 Claims



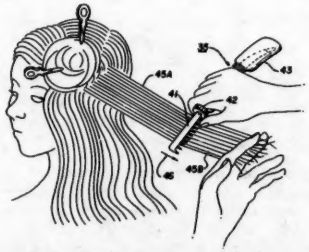
3. A non-combustion smoking article having means for detecting internal temperature changes, comprising:
a non-toxic substrate visible against and printed on the outer surface of the smoking article in a predetermined pattern, from the distal end to a predetermined point; and
a low melting point material capable of melting at a predetermined temperature, disposed on the outer surface of said smoking article, over at least the substrate.

4,987,909

METHOD OF SELECTIVE HAIR COLORING AND COLORING COMB FOR PRACTICING METHOD

Susan L. Snyder, 5917 Ervin St., Springfield, Va. 22150

Continuation of Ser. No. 309,767, Oct. 8, 1981, abandoned, which is a continuation of Ser. No. 856,539, Dec. 1, 1977, abandoned. This application Apr. 30, 1986, Ser. No. 857,347
Int. Cl.[5] A45D *7/00*
U.S. Cl. 132—202 13 Claims



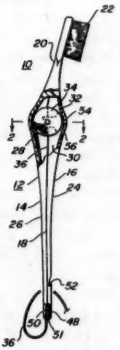
1. The method of treating hair which comprises the steps of:
combing the hair to cause the hair shafts to lie in a natural parallel relationship;
defining a hair parting zone, consisting of the length of all the shafts of hair which have their roots within a closed, contiguous area of the person's scalp;
said area having a generally rectangular shape;
subjecting the hair in said parting zone to tension so as to shape said hair into a laminar sheaf between the scalp and the place where tension is applied to the hair;
said laminar sheaf presenting an exterior face formed by adjacent exposed hair shafts, which exterior face is freely accessible to treatment;
applying thixotropic treating material to the exterior face of said hair treatment zone in a plurality of generally parallel spaced treated areas running along the lay of said hair;
said spaced treated areas being separated by untreated areas running along the lay of said hair;
said application of said thixotropic treating material being applied on the whole or parts of the length of the laminar sheath;
moving through the hair from a portion closer to the scalp to a portion more remote from the scalp, the thixotropic treating material being applied in a traverse along the lay of the hair.

4,987,910

TOOTH BRUSH DEVICE

Todd J. Lowe, 5600 Monmouth Ave., Ventnor, N.J. 08406

Filed Nov. 20, 1989, Ser. No. 438,054
Int. Cl.[5] A45D *44/18*
U.S. Cl. 132—309 5 Claims



1. A tooth brush device comprising an elongated body having a central portion and first and second portions extending in opposite directions therefrom, bristles secured with the first portion of the body providing a brush and the second portion providing a handle for the tooth brush device, the central portion of the body has a chamber therein for storage of dental floss, and the body includes means for dispensing dental floss stored in the chamber and a window for monitoring the floss stored in the chamber of the body, the window of the body comprises a window opening to the chamber and a transparent window cover secured to the body, over and enclosing the opening, the cover of the window is removable to provide a passageway through the window opening for placing and replacing a spool of floss within the chamber of the body for dispensing floss, the central portion of the body has an outer cylindrical surface with the window opening being in the outer cylindrical surface, and the window cover comprises a transparent cylindrical portion removably received and retained within the window opening and conforming with the outer cylindrical surface of the central portion, and the window cover includes a pair of projecting spool retaining elements extending from the cylindrical portion for being received

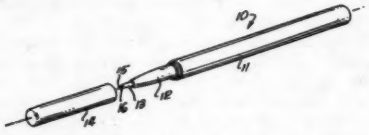
within the chamber of the body for engaging and positioning a spool of dental floss received within the chamber.

4,987,911

COSMETIC PENCIL

Ronald J. Powers, 550 E. Third St., Unit B, Oxnard, Calif. 93030

Filed Jul. 13, 1989, Ser. No. 379,185
Int. Cl.[5] A45D *40/26*
U.S. Cl. 132—320 **14 Claims**



1. A cosmetic pencil capable of advancing a soft cosmetic mass a short, predetermined distance, said pencil comprising:

a lower barrel having a central axis and said lower barrel having a hollow center with an interior surface and having a gripping disk stop member extending from the interior surface thereof;

a hollow sheath member having an inner end and an outer end and having an inner cylindrical opening including an inner end and an outer surface, said sheath member being held within said lower barrel to permit the rotation of the sheath member within the lower barrel, said sheath member extending outwardly from the lower barrel, said sheath member and said lower barrel including means to limit the rotation between the lower barrel and the sheath member, and said sheath member including an outwardly facing cam surface located around its outer surface;

a spring element positioned between said lower barrel and said sheath member urging said sheath member outwardly with respect to said lower barrel;

a hollow holding tube having an inner surface and an outer surface rotatably held in said lower barrel between said lower barrel and said sheath member and said holding tube having an inwardly facing cam surface adjacent said outwardly facing cam surface of said sheath member;

a push rod having a cylindrical exterior surface held axially within said lower barrel and extending into close contact with the inner cylindrical opening of said sheath member and movable into said cylindrical opening;

a cosmetic mass held within said inner cylindrical opening of said sheath member and extrudable therefrom by the insertion of the push rod into said opening; and

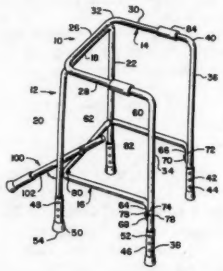
a gripping disk having a central opening slightly larger than the exterior surface of said push rod and an exterior surface that fits within said interior surface of said lower barrel and abuts the gripping disk stop member of the lower barrel, said gripping disk also abutting said spring element, which spring element urges said gripping disk against said gripping disk stop, whereby when said holding tube is rotated with respect to said lower barrel and sheath member, the inwardly facing cam surface of the holding tube moves the outwardly facing cam surface of the sheath member and the sheath member itself inwardly with respect to the lower barrel, forcing the gripping disk against the gripping disk stop causing it to bind against the push rod and hold it steady against the inwardly moving sheath member thereby forcing a small amount of the cosmetic mass outwardly from the sheath member, and when the holding tube is further turned, the cam surface moves into a position permitting the spring element to push the sheath member outwardly positioning it for a later cycle.

4,987,912

WALKER ASSEMBLY HAVING STABILIZER MEANS

George P. Taylor, 274 Hazel, Glencoe, Ill. 60062, assignor to George P. Taylor, Glencoe, Ill.

Filed May 31, 1990, Ser. No. 531,517
Int. Cl.[5] A61H *3/00*
U.S. Cl. 135—67 **25 Claims**



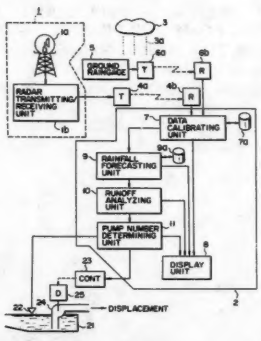
1. A walker assembly comprising a four legged frame of generally U-shaped configuration having at least a cross-member secured rigidly between the front legs thereof, stabilizer means secured on said cross-member at a location generally midway between the ends of said cross-member and extending forwardly and angularly downwardly of said cross-member toward the ground surface whereby to impact against said surface during assumption of and rising from a seated posture by the user of said walker preventing tipping of said walker assembly.

4,987,913

APPARATUS AND METHOD FOR CONTROLLING OPERATION OF STORM SEWAGE PUMP

Hidemi Kodate, Tokyo; Takao Kato, Yokohama, and Shigeo Aoki, Inagi, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 23, 1989, Ser. No. 370,807
Claims priority, application Japan, Jun. 25, 1988, 63-157637
Int. Cl.[5] F16K *17/36*
U.S. Cl. 137—1 **16 Claims**



1. A storm water pump operation control method of controlling an operation state of a plurality of storm water pumps for draining storm water flowing in a sewage treatment plant, comprising:

the step of acquiring rainfall distribution data representing a two-dimensional rainfall distribution state by using a radar rain gages;

the step of measuring actual rainfalls by using ground rain gages;

the rainfall forecasting step of calibrating the rainfall distribution data obtained by said radar rain gage by the rainfalls obtained by said ground rain gages, and forecasting a rainfall in a predetermined time from the present on the basis of several sets of the calibrated past rainfall distribution date; and

the pump number determining step of forecasting a flow of storm water flowing in a pump well on the basis of the forecast rainfall obtained in said rainfall forecasting step.

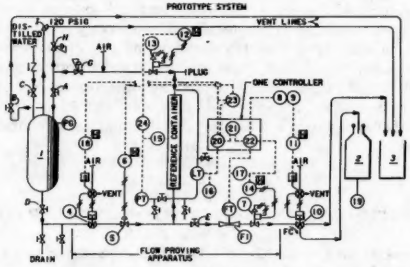
4,987,914
MASS FLOWMETER APPARATUS

Billy R. Adney, Orange, Tex.; Charles W. Alworth, Ponca City, Okla.; John B. Durkee, Ponca City, Okla., and Bryce T. Jeffries, Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Division of Ser. No. 295,862, Jan. 11, 1989. This application Apr. 27, 1990, Ser. No. 515,808

Int. Cl.[5] G01F *3/38*; G05D *7/00*

U.S. Cl. 137—8 **3 Claims**



1. A method for regulating mass flow of a liquid stream from a substantially vertical container having a known mass content per unit of height or weight and being in direct open communication with a source of liquid pressure, said method comprising the steps of:

providing a set minimum positive displacement pressure in the container;

filling the vertical container against the set pressure with minor disturbance of the set pressure;

monitoring the mass of a stream entering the container by measuring the change in pressure or weight within the container;

monitoring the amount of liquid in the vertical container over a measured time interval and determining the rate of flow as change in mass divided by elapsed time as liquid exits the container;

determining a correction factor as being the mass exiting the container divided by integrated output of previous flowmeter readings; and

adjusting the flow rate of exiting liquid to a target flow rate based upon the correction factor.

4,987,915
AUTOMATIC WATER CONTROL APPARATUS

Aaron Goldsmith, 23918 Park Grenada, Calabasas, Calif. 91302

Continuation of Ser. No. 138,317, Dec. 28, 1987, abandoned. This application Mar. 27, 1990, Ser. No. 500,026

Int. Cl.[5] A01G *25/00*

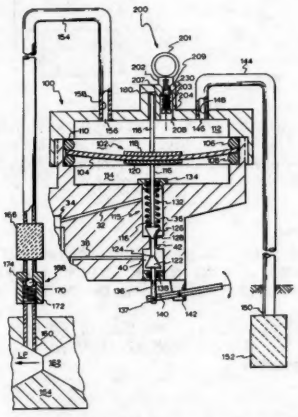
U.S. Cl. 137—78.3 **10 Claims**

1. An automatic control for controlling the flow of water through a system comprising:

(a) a main water control valve means having an open position and a closed position for controlling the flow of water through said main water control valve means, said main water control valve means having an input water connection and an output water connection;

(b) a moisture sensing valve means having a first normal position and a spring biased second position connected to said main water control valve means for opening and closing said main water control valve means depending on the position of said moisture sensing valve means, said moisture sensing valve means responsive to the flow of air through said moisture sensing valve means;

(c) a porous moisture sensing means which is porous to air when dry and impervious to air when wet, said porous moisture sensing means connected to said moisture sensing valve means by a first hollow tubing, said porous moisture sensing means controlling the flow of air through said tubing into said moisture sensing valve means;



(d) a venturi means having a low pressure outlet portion, said venturi means responsive to the flow of water through said water output connection, said low pressure outlet portion of said venturi means connected by a second hollow tubing to said moisture sensing valve means for controlling the position of said moisture sensing valve means whereby when said porous moisture sensing means is impervious to air, the flow of water through said venturi device causes said moisture sensing valve means to change from said first normal position to said spring biased second position and whereby said moisture sensing valve means closes said main water valve means.

4,987,916
LIQUID FLOW CONTROL DEVICE

Peter Miles, Crowthorne, England, assignor to Hydro-Tec Limited, Newbury, England

PCT No. PCT/GB88/00894, § 371 Date Jun. 19, 1989, § 102(e) Date Jun. 19, 1989, PCT Pub. No. WO89/03554, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 10, 1988, Ser. No. 372,385

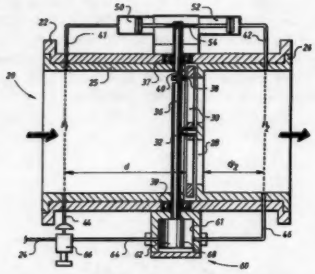
Claims priority, application United Kingdom, Oct. 9, 1987, 8723763

Int. Cl.[5] G05D *11/03*

U.S. Cl. 137—100 **13 Claims**

1. A device for metering a second liquid into a first liquid flowing through a conduit, comprising: a variable, flow controlling orifice in the liquid flow path in the conduit; orifice control means, responsive to the liquid pressures in the liquid flow path at locations spaced apart from and, respectively, upstream and downstream of the variable orifice, for varying the orifice to maintain a predetermined relation between the said liquid pressures at the said upstream and downstream locations; a supply line for the second liquid leading into the conduit downstream of the variable orifice at a position adjacent the said downstream location and where the liquid pres-

sure is substantially the same as the liquid pressure at the said downstream location; and a variable metering valve in the supply line for metering the second liquid; wherein the metering valve is supplied with the second liquid at substantially the



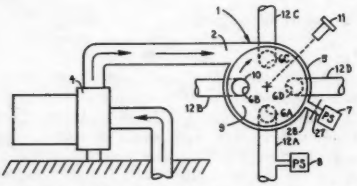
same pressure as the liquid pressure at the said upstream location and is adapted to be driven by the orifice control means to vary its flow coefficient in a predetermined ratio to the varying flow coefficient of the variable orifice.

4,987,917

CONTROLLER SYNCHRONIZATION TO A SEQUENCING DISTRIBUTING VALVE

Carl L. C. Kah, Jr., 778 Lakeside Dr., N. Palm Beach, Fla. 33408

Filed Jul. 11, 1989, Ser. No. 378,015
Int. Cl.[5] F16K *11/04, 31/163*
U.S. Cl. 137—119 **32 Claims**



3. In combination, a valving device having a housing with a plurality of outlets, said valving device having a valve member in said housing responsive to a fluid under pressure in said housing for directing a fluid to one of said outlets in a desired sequence each time a fluid under pressure is directed to actuate said valve member, means for directing a fluid under pressure to said valve member for operating said valve member, pressure responsive means for cycling said means for directing a fluid under pressure to said valve member to position said valve member to direct a fluid under pressure to a preselected outlet, said pressure responsive means including a pressure switch responsive to the pressure directed to actuate said valve member for cycling said means for directing a fluid under pressure to said valve member, said pressure responsive means including a second pressure switch for stopping the cycling of said valve member when it directs a fluid under pressure to a preselected outlet.

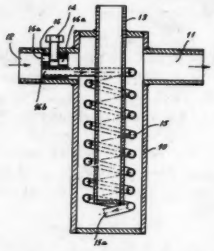
4,987,918

TRAP FOR STEAM CONDENSATES

Miguel S. Barnadas, Ronda Guinardo 61 - 50 1a, 08029 Barcelona, Spain

Filed Dec. 4, 1989, Ser. No. 445,747
Claims priority, application Spain, Dec. 9, 1988, 8900093[U]
Int. Cl.[5] F16T *1/34*
U.S. Cl. 137—171 **2 Claims**

1. A labyrinth trap for steam condensate, comprising a cylindrical body having a generatrice and top and bottom portions; inlet and outlet cylindrical conduits extending from said top portion of said cylindrical body in diametrically opposite directions perpendicular to said cylindrical body; a cylindrical pipe supported inside of said cylindrical body and having a generatrice which is parallel to the generatrice of said cylindrical body; a cylindrical member arranged in the inlet cylindrical



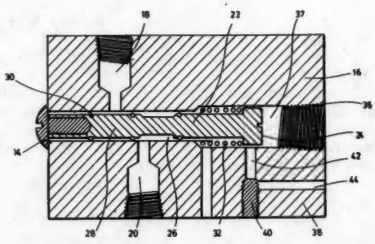
conduit and having a first bore; and coil tubular member wound around said cylindrical pipe and having an upper end communicating with said first bore of said cylindrical member, and a lower end that opens near the bottom portion of said cylindrical body, said cylindrical member having a second bore extending parallel to said first bore, said labyrinth trap further comprising a drainage valve communicating with said second bore.

4,987,919

PNEUMATICALLY ACTIVATED DRAIN VALVE FOR COMPRESSED AIR

Francois Boutin, Ste Elie d'Orford, Canada, assignor to Lucien Orichefsky, Sherbrooke, Canada

Filed Aug. 8, 1989, Ser. No. 390,858
Int. Cl.[5] B01D *17/025*
U.S. Cl. 137—204 **5 Claims**



1. A moisture drain valve for use in a compressed air system including an air compressor, a compressed air storage tank fed by said compressor, and a pressure release system for releasing residual compressed air from said compressor when operation thereof is halted, said drain valve comprising:

an inlet for receiving condensed moisture from said system;

an outlet to drain said moisture; and

slide valve means for reversably connecting said inlet to said outlet, said valve means mounted in a cavity intersecting said inlet and outlet, and comprising return spring means located in said cavity at one end of said slide valve to bias said slide valve in closed position, a piston connected to said slide valve at said one end responsive to said residual compressed air to open said slide valve against said spring means, an opposite end of said slide valve having an adjustable retaining screw threaded therein for adjustably retaining said slide valve in an initial position against action of said spring means, a first O-ring located near said other end, a second O-ring located near said one end, and

a third middle O-ring located between said first and said second O-rings, each said O-ring being arranged around a circumference of said body and making slideable sealing contact with a wall of said cavity, said inlet communicating with said cavity between said first and middle O-rings when said slide valve is in said initial position, and said outlet communicating with said cavity between said middle and second O-rings when said slide valve is in said initial position.

4,987,920

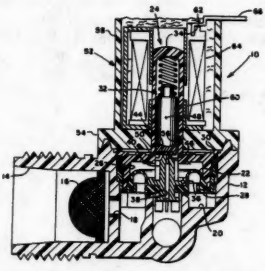
DIAPHRAGM ACTUATED VALVE ASSEMBLY

Richard A. Donner, Hanover Park, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Apr. 25, 1990, Ser. No. 516,494

Int. Cl.[5] F16K *31/06*; B08B *9/00*; F16K *51/00*

U.S. Cl. 137—242 **3 Claims**



1. An improved valve assembly for a valve of the type having a pressure responsive diaphragm:

(a) body structure defining a valve outlet port with an annular valve seating surface thereabout and having a second surface radially outwardly of an intersecting said annular seating surface;

(b) a flexible diaphragm having the periphery thereof sealingly secured to said body structure and a central portion movable between a position contacting and a position spaced from said annular seating surface;

(c) annular flexible wiper means attached to said diaphragm and extending therefrom in a direction toward said second annular surface, said wiper means configured such that upon movement of said diaphragm intermediate portion said wiper means contacts said second annular surface in fluid pressure sealing arrangement before said diaphragm intermediate portion closes on said annular seating surface said wiper means thereby providing redundant sealing with said annular sealing surface; and,

(d) means operative to move said diaphragm valving surface between said open and closed position, and forming an annular space as said wiper means engages said second annular surface for trapping foreign particles continuously as said diaphragm intermediate portion contacts said annular seating surface which prevents such particles from being trapped on said annular seating surface which might prevent said diaphragm intermediate portion from closing.

4,987,921

METHOD OF FABRICATING FROZEN FINE LIVER PIECE FOR ARTIFICIAL LIVER, APPARATUS FOR FREEZING THE SAME AND FREEZING VESSEL

Yoichi Kasai, deceased, late of Sapporo (by Motoko Kasai, representative); Akio Kawamura, Sapporo; Yoshimi Nakanishi, Sapporo; Akira Kakita, Sapporo; Toshihiko Tsuburaya, Sapporo; Yasuo Kuraoka, and Nobuo Sakao, both of Ibaraki, all of Japan, assignors to Hoxan Corporation, Sapporo, Japan

Division of Ser. No. 245,925, Sep. 16, 1988, Pat. No. 4,883,452, which is a continuation of Ser. No. 661,496, Oct. 16, 1984, abandoned. This application Sep. 15, 1989, Ser. No. 408,111

Claims priority, application Japan, Jan. 17, 1984, 59-6172; Mar. 2, 1984, 59-30260[U]; Mar. 16, 1984, 59-37533[U]; Mar. 16, 1984, 59-37534[U]

Int. Cl.[5] A61B *19/00*; F25D *25/00*

U.S. Cl. 137—561 R **7 Claims**

1. A freezing vessel for fabricating frozen fine liver pieces for an artificial liver comprising:

an essentially solid, unperforated cover unit formed of a ceiling plate and a peripheral side wall, the ceiling plate including an upper coupling port extending through the ceiling plate and capable of being selectively coupled with a first coolant flow conduit, or closed by a first plug for transport purposes, the cover unit also including a mesh plate for preventing movement of the fine liver pieces out of the vessel through the upper coupling port, and the peripheral side wall being formed with a lower coupling portion,

at least one solid, unperforated hollow coupling cylinder unit including an upper coupling portion selectively detachable from or rigidly connectable to the lower coupling portion of said cover unit, and including a lower coupling portion, and

an essentially solid, unperforated bottom unit formed of a bottom plate and a peripheral side wall, the bottom plate including a lower coupling port extending through the bottom plate and capable of being selectively coupled with a second coolant flow conduit, or closed by a second plug for transport purposes, and the peripheral side wall including an upper coupling portion selectively detachable from or rigidly connectable to the lower coupling portion of an adjacent one of the coupling cylinder units; and

at least one of the coupling cylinder units or the bottom unit including a laterally positioned mesh plate for supporting the fine liver pieces in the vessel.

4,987,922

STORAGE TANK FOR TWO FLUIDS OF DIFFERENT DENSITY

John S. Andrepont, Naperville; Robert S. Wozniak, Elmhurst, both of Ill., and Chapin O. Saint, Spring, Tex., assignors to Chicago Bridge & Iron Technical Services Company, Oak Brook, Ill.

Filed Apr. 20, 1989, Ser. No. 340,704

Int. Cl.[5] F17C *13/00*

U.S. Cl. 137—592 **32 Claims**

1. An enclosed storage tank for the simultaneous addition and removal, and storage, of two liquid layers of different density comprising:

a tank shell having a bottom, a side wall extending upwardly from the bottom, a roof supported at least in part by the side wall and at least one vertical tubular column extending upwardly from the shell bottom to at least close to the roof;

a substantially horizontal first liquid distributor means, spaced around and extending outwardly of the column periphery, above which the column extends and spaced above the shell bottom;

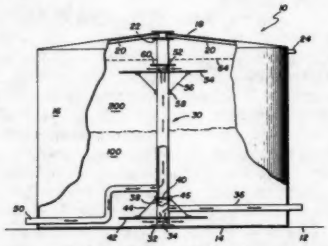
a plurality of first openings in the column between the first liquid distributor means and the shell bottom;

a high density liquid conduit extending from outside the

shell into communication with the column interior whereby high density liquid can be fed to the column interior and then flow out the first opening means into the lower portion of the tank beneath the first distributor means and the high density liquid can be withdrawn from the tank through the first opening means and then through the high density liquid conduit;

a substantially horizontal second liquid distributor means above and below which the column extends and with the second liquid distributor means spaced below the shell roof;

second opening means in the column between the second liquid distributor means and the shell roof;



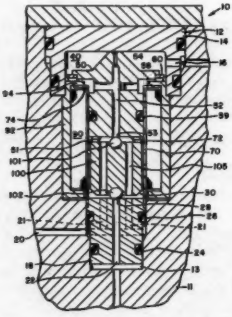
a low density liquid conduit extending from outside the shell into communication with the column interior whereby low density liquid can be fed to the column interior and then flow out the second opening means into the upper portion of the tank above the second liquid distributor means while high density liquid is withdrawn from the tank through the high density liquid conduit, and the low density liquid can be withdrawn from the tank through the second opening means and then through the low density liquid conduit while the high density liquid is fed to the tank through the high density liquid conduit.

4,987,923

SOLENOID VALVE

Wendell D. Tackett, South Bend, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Jun. 22, 1989, Ser. No. 370,523
Int. Cl.[5] F15B *13/044*
U.S. Cl. 137—596.17 **15 Claims**



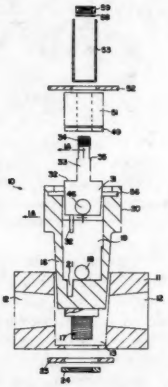
1. A solenoid valve, comprising a body having at one end a first opening and at a second end second and third openings, the first opening communicating with a chamber located within said body, a shuttle valve disposed reciprocably within said chamber and having a first orifice opening communicating with a longitudinal through-opening in the shuttle valve and a transverse opening which extends transversely through the shuttle valve and intersects the longitudinal through-opening, first resilient means disposed between said shuttle valve and said body in order to bias said shuttle valve toward a normal position which permits fluid to flow past said resilient means and to said transverse opening, an armature disposed within said body and located between said first and third openings, second resilient means disposed between said shuttle valve and armature, the armature comprising a reciprocably movable valve member having a pair of parallel axial through-passages and at one end a first valve member aligned with a valve seat of said longitudinal through-opening of the shuttle valve and at the other end a second valve member which sealingly engages a valve seat of the third opening, the second opening in the body communicating with said parallel axial through-passages and an interior area of said body wherein said armature is disposed, and coil means disposed within said body and about said shuttle valve and armature, so that energization of said coil means causes said first valve to sealingly engage the valve seat of said longitudinal through-opening and said second valve to disengage from the valve seat of said third opening which then communicates with said second opening, and a resulting pressure differential across said shuttle valve and armature causing conjoint movement of the shuttle valve and armature toward said third opening so that fluid in said chamber flows through said orifice opening.

4,987,924

INTERCHANGEABLE AUTOMATED PORTING VALVE

William F. Rush, Tinley Park, Ill.; Dennis L. Sadowski, Van Nuys, Calif., and Hyman A. Todres, Skokie, Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 218,675, Jul. 15, 1988, abandoned. This application Feb. 12, 1990, Ser. No. 478,347
Int. Cl.[5] F16K *11/20*
U.S. Cl. 137—614.18 **14 Claims**



1. An interchangeable plug valve comprising: a valve body having a first through hole and a first cavity, an outer valve plug having a second through hole, said outer valve plug rotatably and sealably seated within said first cavity, rotating means for rotatably aligning said first through hole with said second through hole, first retaining means for retaining said outer valve plug in a seated and sealed position within said first cavity;

an inner valve plug having a through channel non-rotatably aligned with said second through hole of said outer valve plug, said inner valve plug being non-rotatable with respect to said outer valve plug;

second retaining means for seating and sealing said inner valve plug within said second cavity of said outer valve plug, said second retaining means comprising a flat lock-

ing washer having a centered through hole and a plurality of locking lugs, a valve stem secured to said inner valve plug, said valve stem extending through said centered through hole of said flat locking washer, said locking lugs lockable within a retaining groove of said outer valve plug; and

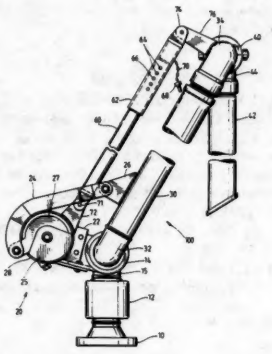
actuating means for controlling fluid flow through said through channel of said inner valve plug.

4,987,925

LOADING ARM WITH A LOCK-DOWN DEVICE

Evart J. Vroonland, Richardson, Tex., assignor to LTV Energy Products, Houston, Tex.

Filed Sep. 29, 1989, Ser. No. 414,948
Int. Cl.[5] F16L *3/00*
U.S. Cl. 137—615 **16 Claims**



3. A loading arm, comprising:

(a) a support structure;

(b) a swivel arm having a riser end and a port end, the riser end of the swivel arm being pivotally attached to the support structure for swivel movement in the horizontal and vertical planes relative to the support structure;

(c) a spring balance assembly attached to the swivel arm and to the support structure to balance the swivel arm;

(d) a lock-down device comprising:

a linkage arm having a lower and an upper end, the lower end of the linkage arm being pivotally connected to the support structure, and the upper end of the linkage arm having a plurality of through holes therein,

a guide member fixedly attached to the port end of the swivel arm and adapted for slidably receiving the upper end of the linkage arm, the guide member having at least one through hole generally aligned with the plurality of linkage arm through holes, and

a lock-in adapted to lock the linkage arm into the guide member at a desired hole location of the linkage arm.

4,987,926

FAUCET USING A CISTERN PUMP HANDLE AND A WATER MIXING VALVE

William L. Simmons, 36353 W. Lyman Rd., Farmington Hills, Mich. 48331

Filed Feb. 5, 1990, Ser. No. 475,227
Int. Cl.[5] F16K *27/06, 31/52*
U.S. Cl. 137—625.4 **6 Claims**

1. A hand-operated water faucet apparatus, comprising:

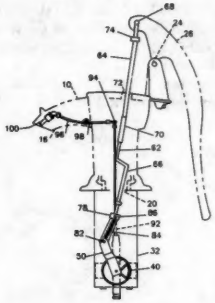
an elongated cistern-type pump body means adapted to be supported in an upright position, said pump body means having an upper end, and a base with a lower opening;

an elongated handle;

pivot means mounted on the upper end of the pump body means and connected to the handle such that one end thereof is swingable in an arc disposed in a plane generally parallel to the longitudinal axis of the pump body means;

the pump body means having a spout projecting therefrom in a position spaced above the base;

valve means having an inlet adapted to be connected to a source of water under pressure, the valve means having an outlet for passing said pressurized water, the valve means including an actuator member moveable between first and second positions such that water passes from the inlet of the valve means to the outlet when the actuator member is



in said first position, and water passage through the valve means is blocked when the actuator member is disposed in said second position;

linkage means connected between the handle and the actuator member for moving same; and

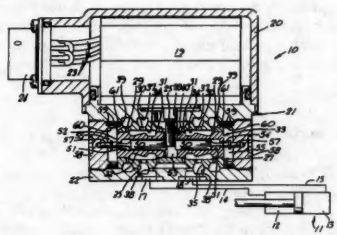
conduit means having one end connected to the outlet of the valve means, and an opposite end disposed in the spout to pass water from the spout when the handle has been moved to actuate the valve means to pass water from said inlet to the outlet thereof.

4,987,927

DIRECT-DRIVE VALVE

Mathew L. Kluczynski, Chatsworth, Calif., assignor to Sterer Engineering and Manufacturing Company, Los Angeles, Calif.

Filed Dec. 27, 1988, Ser. No. 289,740
Int. Cl.[5] F15B *13/044*
U.S. Cl. 137—625.65 **18 Claims**



11. A direct-drive hydraulic valve for controlling a flow of fluid under pressure from a source to a driven device, comprising:

a valve body;

a valve member mounted for movement relative to said body along a predetermined path;

port means on said body and said member for establishing communication between the source and the driven device;

direct drive means for selectively moving said member relative to said body, including a mechanical driving connection with said member;

pressure balancing means for normally applying equal and

oppositely directed forces to said member, including opposed hydraulic pressure chambers and means for normally equalizing the pressure in said chambers to produce said equal and oppositely directed forces;

and pressure differential means activated in response to the encountering of a resistance to movement of said member greater than a preselected force level for applying a hydraulic pressure differential to said pressure chambers to overcome the resistance to movement.

4,987,928

DOUP HEDDLE WITH MAGNETIC COUPLING PART

Rudi Gaisser, Reutlingen, Fed. Rep. of Germany, assignor to C. C. Egelhaaf GmbH & Co. Maschinenfabrik KG, Reutlingen, Fed. Rep. of Germany

Filed Sep. 1, 1989, Ser. No. 403,146

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1988, 3830107

Int. Cl.[5] D03C *7/00*

U.S. Cl. 139—52 **14 Claims**

1. A twisting device for power looms, comprising oppositely moving heddle supporting rails; two lifting heddles arranged on said heddle supporting rails for standing threads; a semi-heddle for turning threads controlled separately from said heddle supporting rails; a coupling part having magnetic properties and arranged so that said semi-heddle is supported through said coupling part on both said lifting heddles in a longitudinally displaceable manner; two countercoupling parts having magnetic property and alternatingly cooperating with said coupling part, one of said countercoupling parts being movable together with one of said heddle supporting rails while the other of said countercoupling parts being movable together with the other one of said heddle supporting rails.

4,987,929

FORMING FABRIC WITH INTERPOSING CROSS MACHINE DIRECTION YARNS

Robert G. Wilson, Wake Forest, N.C., assignor to Huyck Corporation, Wake Forest, N.C.

Filed Aug. 25, 1989, Ser. No. 398,408

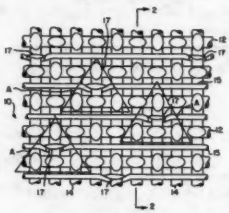
Int. Cl.[5] D03D *13/00, 15/00*

U.S. Cl. 139—383 A **13 Claims**

1. A papermakers' fabric comprising:

a fabric layer including at least one set of cross machine direction yarns and at least one set of machine direction yarns interwoven to form a papermaking surface and a machine contacting surface wherein the machine direction yarns are interwoven to form alternating single knuckles on the paper contacting surface;

additional fiber supporting cross machine direction yarns positioned between adjacent cross machine direction yarns on the papermaking surface of the fabric layer; and additional cross machine direction locator yarns positioned between adjacent cross machine direction yarns on the papermaking surface of the fabric layer,



wherein the additional fiber supporting cross machine direction yarns and the additional cross machine direction locator yarns are interwoven with the fabric layer in opposite weave patterns.

4,987,930

AUXILIARY SUB-NOZZLE FOR FLUID JET LOOM

Masahiro Okesaku, 133-1, Ha, Minamiasai-machi, Komatsu-shi Ishikawa, 923; Michito Miyahara; Ryosuke Ataka, both of Fukuoka, and Tororu Nakagawa, Komatsu, all of Japan, assignors to Nippon Tungsten Co.; Ltd. Tsudakoma Corp., both of Fukuoka and Masahiro Okesaku, Ishikawa, all of, Japan

PCT No. PCT/JP88/01023, § 371 Date Jul. 5, 1989, § 102(e) Date Jul. 5, 1989, PCT Pub. No. WO89/04390, PCT Pub. Date May 18, 1989

PCT Filed Oct. 6, 1988, Ser. No. 381,709

Claims priority, application Japan, Nov. 11, 1987, 62-284468

Int. Cl.[5] D03D *47/30*

U.S. Cl. 139—435.5 **16 Claims**

1. An auxiliary nozzle adapted for use with a fluid jet-type loom, comprising a hollow nozzle body having an inner surface, said hollow nozzle body including a tip portion formed of integrally-molded ceramics material, said ceramics material having a superfine grain size, high toughness and high strength, said nozzle body further including a jet orifice in said tip portion for jetting pressurized gas from inside said nozzle body to an exterior of said nozzle body, said jet orifice having an inner surface, the inner surface of said nozzle body and said jet orifice having a surface roughness of 0.5 μm or less.

4,987,931

WEFT SUPPLY DEVICE INCLUDING MULTIPLE THREAD PACKAGES AND PREPARATION MECHANISMS

Henry Shaw, Vleteren, and Roger Ligneel, Beselare, both of Belgium, assignors to Picanol N.V., Belgium

Filed Jul. 25, 1989, Ser. No. 384,807

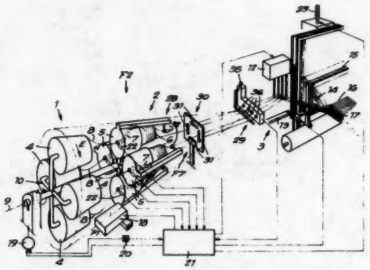
Claims priority, application Belgium, Jul. 25, 1988, 8800860; Jul. 25, 1988, 8800863; Jul. 25, 1988, 8800864

Int. Cl.[5] D03D *47/34*

U.S. Cl. 139—450 **35 Claims**

1. A device for supplying weft threads to a weaving machine shed, comprising a plurality of thread supplies and means for operatively connecting said thread supplies for rotation together as a set; a set of thread preparation mechanisms including means for receiving weft threads from said thread supplies; means for operatively connecting said thread preparation mechanisms and thread supplies such that said thread prepara-

tion mechanisms are rotatable together with said set of thread supplies; and insertion means for inserting weft threads received from the thread preparation mechanisms into the shed of the weaving machine, wherein said set of thread supplies



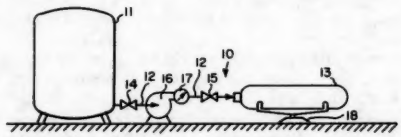
and corresponding set of thread preparation mechanisms have a common axis of rotation, and said device further comprises means for permitting said thread supplies and thread preparation mechanisms to be rotated at any moment to any angular position.

4,987,932

PROCESS AND APPARATUS FOR RAPIDLY FILLING A PRESSURE VESSEL WITH GAS

Robert M. Pierson, 44 E. Boston Mills Rd., Hudson, Ohio 44236

Filed Oct. 2, 1989, Ser. No. 416,028
Int. Cl.[5] F17C *7/02;* B65B *31/00*
U.S. Cl. 141—001 9 Claims



1. A process for rapidly filling a pressure vessel with highly pressurized gas comprising the steps of:

(A) providing a liquid source containing cryogenic liquid at a temperature below −150° F. (101° C.);

(B) providing a pressure vessel of a predetermined internal volume which is capable of a design working pressure of between 500 psi (35.2 kg/cm^2) and 4,000 psi (280 kg/cm^2);

(C) providing a conduit connecting the liquid source to the interior of the pressure vessel; and

(D) transferring from the liquid source to the pressure vessel, a sufficient amount of the cryogenic liquid that when such liquid reaches at least 0° F. (−17.8° C.), within the pressure vessel, it will convert to a gas under a pressure of at least 50% of the design working pressure of said pressure vessel.

4,987,933

FLUID FLOW CONTROL METHOD AND APPARATUS FOR MINIMIZING PARTICLE CONTAMINATION

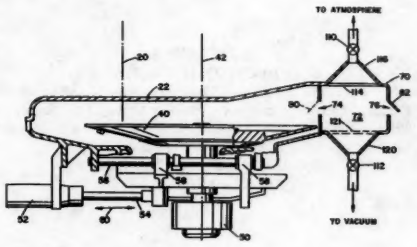
Michael E. Mack, Manchester, Mass., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 3, 1989, Ser. No. 319,257
Int. Cl.[5] G05D *16/00;* F16K *24/04*
U.S. Cl. 141—7 12 Claims

1. An ion implantation system for treating silicon wafers comprising:

(a) an implantation chamber that defines a chamber interior into which the wafers are moved for treatment, said chamber having an opening for inserting wafers into the chamber prior to treatment and removing the wafers from the chamber after they have been treated;

(b) a pressure chamber in fluid communication with the implantation chamber through the opening of the implantation chamber including at least one opening for allowing air to enter the pressure chamber through a first flow control passageway and for evacuating the pressure chamber by withdrawing air in the pressure chamber through a second flow control passageway;



(c) a pressure sensor for monitoring pressure inside the pressure chamber and providing a pressure signal indicative of a sensed pressure; and

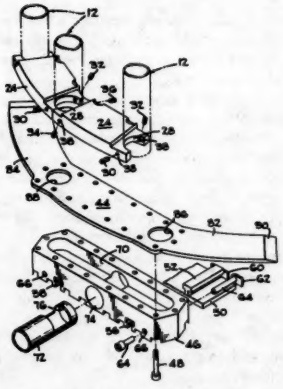
(d) a flow controller for monitoring the pressure signal from the pressure sensor and adjusting air flow rates of air entering or existing the pressure chamber via the first and second flow control passageways to avoid contamination of the pressure chamber interior caused by too high a flow rate of air moving into or out of the chamber.

4,987,934

CLEANER FOR FILLER NOZZLES

Stanley A. Groom, Hoopeston, Ill., assignor to FMC Corporation, Chicago, Ill.

Filed Jul. 5, 1989, Ser. No. 375,647
Int. Cl.[5] B67C *3/26*
U.S. Cl. 141—89 6 Claims



1. A cleaner for a filler having a plurality of cylinders arranged in a circle and rotatable as a unit about the center thereof, each cylinder having a nozzle at its lower end for depositing product into a container conveyed therewith during a portion of each rotation of said filler; said cleaner comprising:

a vacuum manifold having a cavity mounted on said filler and fixed against rotation;

means connecting said cavity to a vacuum source;

a seal plate attached to the top of said manifold;

an upper seal means encircling all of said cylinders and rotatable therewith;

a circumferential groove 42 formed in the seal means; and

said nozzles being positioned in said groove whereby said vacuum source draws air past said nozzles to cause product on said nozzles to be swept into said cavity.

4,987,935

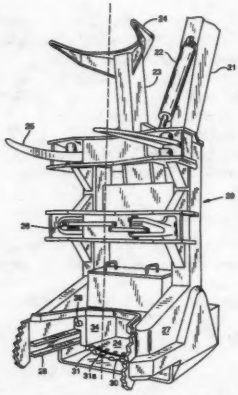
BI-DIRECTIONAL TREE SAW

Sean P. Corcoran, Hillsboro, Oreg.; Thomas E. Dixon; Stanley Farmer, both of Vancouver, Wash.; Emory D. Hungerford, Milwaukee, and Mark Mallory, Portland, both of Oreg., assignors to Esco Corporation, Portland, Oreg.

Filed Jan. 5, 1990, Ser. No. 461,358

Int. Cl.[5] A01G *23/08*

U.S. Cl. 144—34 R **36 Claims**



1. A bi-directional tree saw comprising a frame adapted to be attached to the boom or lift arms of a prime mover, tree clamping means on said frame, a carriage assembly on said frame below said clamping means,

said carriage assembly including a generally plate-like chassis, a generally U-shaped bulkhead upstanding from said chassis providing a recessed base portion and forwardly-extending arm portions, slide means on said arm portions,

rail means on said frame receiving said slide means for reciprocating movement of said carriage assembly,

hydraulic cylinder means interconnecting said bulkhead and frame for reciprocating said carriage assembly,

an annular rim member rotatably mounted on said chassis, said rim member having a geared inner circumference and a toothed outer circumference projecting forwardly of said base portion,

means on said tree saw for receiving rim rotation direction allowing said tree saw to cut in clockwise and counter clockwise directions,

teeth mounted pivotally to said rim with two cutting edges allowing said tree saw to cut in both clockwise and counterclockwise directions and said teeth pivoting about the retaining bolt to provide rake angle required for cutting in each direction,

motor-driven pinion means on said chassis for engaging said rim member inner circumference to rotate said rim member.

4,987,936

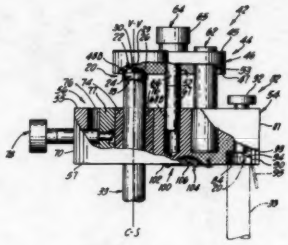
CUE TIPPERS

Peter A. Calabrese, 18 Gallow's Row, Minersville, Pa. 17954

Filed Mar. 5, 1990, Ser. No. 487,909

Int. Cl.[5] B27G *1/00*

U.S. Cl. 144—346 **14 Claims**



4. Apparatus for assembling to a cue stick, a tip having a convex cap portion for striking a ball and a portion with a planar end for connecting the tip to such cue stick, comprising:

a stick holder, having first and second opposing sides, including means for fixedly holding a cue stick such that an internal centerline of such stick coincides with a given assembly axis and a free, tip end of such cue stick protrudes from the first side of the holder;

disposed opposite the first side of the holder, a tip positioner having a second side and a first, opposing side facing toward the first side of the stick holder, including means for positioning at least one cue tip, by engaging primarily the cap, so a desired dome portion of such cap has a desired centerline coinciding with the assembly axis and the connecting portion of the tip has its planar end facing toward and parallel with the free, tip end of the cue stick; and

connecting the tip positioner to the holder, means for adjustably, guidably, moving together such positioner and the holder along a precise path for bringing the cue tip into clamping contact with the free end of the cue stick, the centerlines of the desired dome of the cue tip and stick being held therealong in coincidence with the assembly axis for assembling the tip to the stick.

4,987,937

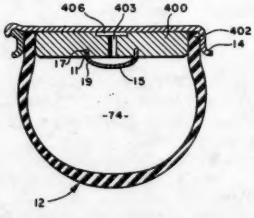
IN-TIRE FILTER ASSEMBLY FOR CENTRAL TIRE INFLATION SYSTEM

John H. Nowicke, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jul. 3, 1989, Ser. No. 374,793

Int. Cl.[5] B60C *7/24, 15/02, 29/06*

U.S. Cl. 152—400 **5 Claims**



1. An in-tire filter assembly for a central tire inflation system **(10)** that has a fluid feed line **(71)** and a tire **(12)**, comprising:

a bead lock **(400)** assembled to said tire and having a passage **(403, 406)** therethrough for fluid communication between

the pressurized chamber (74) of said tire and said fluid feed line (71);

a filter (15) inside the tire affixed to the bead lock and having a transmission area so that fluid passing through the passage also passes through the filter;

said transmission area of said filter (15) being at least four times as great as the cross-sectional area of said passage (403, 406);

means for retaining said filter comprising a groove (17) configured in the in-tire surface of said bead lock (400), and adhesive material (11) engaging, at least at said groove, both said filter (15) and said bead lock.

4,987,938

PNEUMATIC TIRES INCLUDING SPIRALLY WOUND AUXILIARY LAYER OUTSIDE BELT

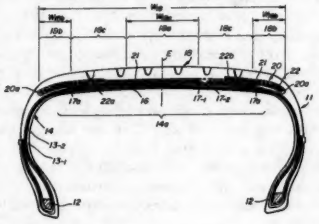
Hisao Ushikubo, Kodaira; Toru Tsuda, Higashimurayama, and Ichiro Takahashi, Niiza, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 41,040, Apr. 22, 1987, abandoned. This application May 30, 1989, Ser. No. 358,522

Claims priority, application Japan, Apr. 22, 1986, 61-94240

Int. Cl.[5] B60C 9/22, 9/26

U.S. Cl. 152—528 7 Claims



1. A pneumatic tire comprising; a pair of beads, a toroidal carcass composed of at least one carcass ply which extends between the beads and is composed of cords arranged substantially in a radial direction of the tire, a belt layer superimposed radially outside a crown portion of the carcass, a tread arranged radially outside the belt layer to cover the belt, and an auxiliary layer arranged between the tread and the belt layer to cover the entire belt layer and composed of an organic fiber cord arranged substantially in parallel with the tire circumferential direction, wherein the tread comprises a tread central portion containing a tire equatorial plate and extending over 30% of the tread width, a pair of tread side edge portions covering side edges of the belt layer each of said tread side edge portions extending over 15% of the tread width from a tread edge inward, and a pair of tread intermediate portions between the tread central portion and the tread side edge portions, the auxiliary layer consisting of two plies at at least axially width-wise opposite edge portions and composed of a continuous cord member composed of a ribbon-like cord member containing 2–12 rubberized thermally shrinkable cords, said auxiliary layer being formed by spirally winding said cord member from its one end located corresponding to one of said tread intermediate portions as a starting point toward one of the opposite side edges of the auxiliary layer in the axial direction; when the spirally wound cord member reaches said one of the opposite side edges, turning back and then spirally winding the cord member toward the other opposite side edge of the auxiliary layer; and when the spirally wound cord member reaches said other opposite side edge, turning back and then spirally winding the cord member until the cord member reaches a position corresponding to another tread intermediate portion which is symmetrical with the starting point through the tire equatorial plane or until the continuous cord member reaches substantially the starting point corresponding to said tread intermediate portion, both ends of said ribbon-like cord member having a shape cut at an angle with respect to the equatorial plane of said tire in the range of 20° to 60° and being separated from each other in the axial direction of said tire, and said tire having an aspect ration in the range of 0.35 to 0.6 defined by a tire sectional height to a tire sectional width.

4,987,939

HEAVY DUTY PNEUMATIC RADIAL TIRES WITH CARCASS PLIES COMPOSED OF AROMATIC POLYETHERAMIDE CORDS

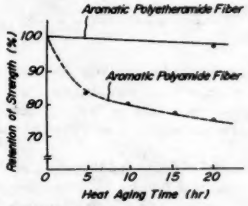
Shigeki Yamada; Motoaki Taniguchi, both of Tokyo; Masanobu Takahashi, Iruma, and Kenshiro Kato, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 906,053, Sep. 11, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,835

Claims priority, application Japan, Sep. 13, 1985, 60-203180

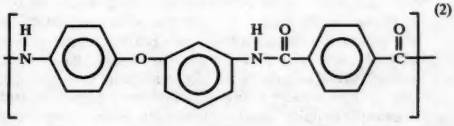
Int. Cl.[5] B60C 9/02

U.S. Cl. 152—556 1 Claim

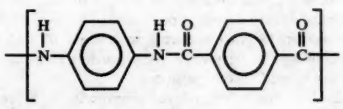


1. A heavy duty pneumatic radial tire comprising a tread portion, a pair of sidewall portions extending between both shoulders of the tread portion, a pair of bead portions each formed at the inner end of the sidewall portion, and a reinforcement consisting of a carcass composed of at least two plies, each containing cords arranged in the radial direction of the tire, wherein said plies are wound around the bead portion from the inside toward the outside, and a breaker surrounding the carcass, wherein each of said carcass plies is composed of:

(A) cords, each made from a fiber of an aromatic copolyamide, wherein said aromatic copolyamide is an aromatic polyetheramide, having as a unit A, a unit represented by formula (2):



and a unit B represented by the following formula (1*b*):



and

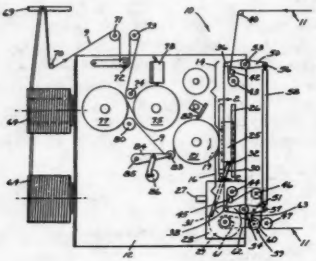
(B) a coating rubber composition consisting essentially of natural rubber or a blend of natural rubber and isoprene rubber as a rubber component and 2.4–4.5 parts by weight of resorcin, 0.7–1.5 parts by weight of hexamethylene-tetramine and 2–10 parts by weight of silica per 100 parts by weight of the rubber component, and having a 100% modulus after vulcanization of 35–50 kg/cm^2.

4,987,940

CROSS WEB LAYER APPLICATION DEVICE

Melvin J. Straub, Plymouth; Edwin Kalash, Independence, and Douglas A. Swenson, Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 19, 1988, Ser. No. 234,310
Int. Cl.[5] B32B *31/10*
U.S. Cl. 156—164 23 Claims



1. An application device for applying layers of material in spaced relationship generally transversely across an elongate longitudinally moving web having first and second parallel edges and opposite major surfaces, said device comprising:

a frame;

means on said frame for defining a through path for the web including means for defining

an inlet path portion along which inlet path portion the edges of the web move generally in imaginary parallel planes disposed at right angles to the surfaces of the web, which inlet path portion terminates at a terminal end,

an outlet path portion along which outlet path portion the edges of the web move generally in imaginary parallel planes parallel to and spaced from said planes in which generally move the edges of the web along the inlet path portion, said spacing being in a direction normal to the edges of the web along the inlet path portion, which outlet path portion begins at a beginning end adjacent said terminal end, and

a transverse path portion between said terminal and beginning ends of the inlet and outlet path portions;

means on said frame for periodically moving said means for defining the transverse path portion so that a portion of the web along the transverse path portion moves generally edgewise in a direction parallel to said planes while the individual lengths of the inlet and outlet path portions are simultaneously changed, which movement of said means for defining the transverse path portion is between a first position at which the inlet path portion has its minimum length and a second position at which the inlet path portion has its maximum length; and

means on said frame for applying a layer of material generally transversely across a portion of the web along the transverse path portion during movement of said means for defining the transverse path portion from said first position to said second position;

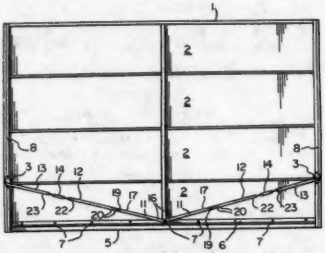
so that when the web is moved lengthwise at a predetermined speed in a first direction along said inlet and outlet path portions and said means for defining the transverse path portion is moved from said first position to said second position at said predetermined speed the longitudinal movement of the portion of the web along the transverse path portion is essentially stopped, and the layer of material can be applied transversely across the portion of the web along the transverse path portion by said means for applying.

4,987,941

DOOR REINFORCING DEVICE

Robert Wold, P.O. Box 184, Alliance, Alberta T0B 0A0, Canada

Filed Oct. 6, 1988, Ser. No. 254,246
Claims priority, application Canada, Jun. 2, 1988, 568499
Int. Cl.[5] E06B *3/48*
U.S. Cl. 160—130 4 Claims



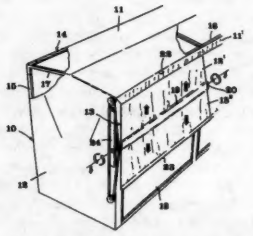
1. In combination, a multi-sectional door of the type including a plurality of horizontal panels interconnected at each end to adjacent panels by hinges, and a reinforcing device for said door, said device comprising two first bar means; two first flat connector means; notch means in said two first connector means, whereby said first connector means connect one end of each of said first bar means to respective hinges on each side of the door; two second bar means; two second connector means connecting one end of each said second bar means to the bottom center of the door panel; and turnbuckle means interconnecting the other ends of said first and second bar means, whereby the first and second bar means and the turnbuckle means extend between the bottom center of at least the lowermost door panel and the upper outer corners thereof to transfer the load on the door center to both sides of the door to prevent sagging thereof.

4,987,942

COVER ARRANGEMENT, ESPECIALLY FOR VEHICLES

Jens Eriksson, Hudiksvall, Sweden, assignor to Aktiebolaget Jens Eriksson, Hudiksvall, Sweden

PCT No. PCT/SE88/00315, § 371 Date Dec. 20, 1989, § 102(e) Date Dec. 20, 1989, PCT Pub. No. WO89/00513, PCT Pub. Date Jan. 26, 1989
PCT Filed Jun. 13, 1988, Ser. No. 438,391
Claims priority, application Sweden, Jul. 21, 1987, 8702925
Int. Cl.[5] A47H *1/00*
U.S. Cl. 160—243 5 Claims



1. A door structure including a retractable cover, said cover comprising:

a cover portion, a rolling-up section extending transversely along a center line of said cover portion, said cover portion nonrotatably connected to said rolling-up section;

means for rotating said rolling-up section, said means including a guide member for guiding one end of said rolling-up section, a toothed element non-rotatably mounted at said

one end of said rolling-up section, a plurality of tooth engaging members spaced along said guide member for successive engagement by teeth on said toothed element, from a first, unrolled, position to a second, rolled, position, said tooth engaging members spaced at progressively increased distances from said unrolled position to said rolled position; and

means of pulling said rolling-up section in said guide member engagement between said toothed element and said tooth engaging members resulting in rotation of said toothed element and said attached cover portion, movement of said rolling-up section in one direction rotating said rolling-up section in a first direction and movement of said rolling-up section in the other direction rotating said rolling up section in a second opposite direction.

4,987,943

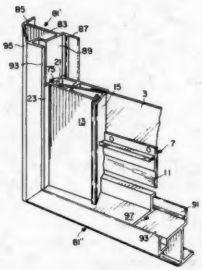
WEDGING ASSEMBLY FOR SEALING AN EDGE OF A WINDOW SHADE

Gérald Charest, Malartic, Canada, assignor to Cel-Franc Inc., Val d'Or, Canada

Filed Dec. 20, 1989, Ser. No. 453,881

Int. Cl.[5] E06B *9/17*

U.S. Cl. 160—269 **20 Claims**



1. A profile assembly for wedge-sealing an edge of a window shade comprised of a sheet of flexible material, said assembly comprising:

a U-shaped female profile having a pair of opposed, free-ended legs and defining a housing opened at the free ends of said legs; one of said legs having, at the free end thereof, a sealing lip turned into said housing and made of resilient material; the other leg having at the free end thereof, a first wedging lip facing said sealing lip;

a generally L-shaped male profile having a wedging branch and a base branch, said branches making therebetween an inner wedging angle of less than 90°; wherein said base branch includes, at the end thereof away from said wedging branch, an upright arm having a second wedging lip on the face of said arm looking away from said wedging branch;

wherein said sealing lip, when unstressed, and said first wedging lip are spaced apart a predetermined distance and wherein the length of said base branch is greater than the said distance; said length and said distance being selected to allow, in use with said wedging branch inserted in said housing and with an edge of said window shade slid between said sealing lip and said wedging branch: said second lip to be brought first against said first lip, then to be moved over said first lip thereby causing said shade to be sealed pressed against said sealing lip by said wedging branch, and thereafter said second lip to fall behind said first lip and be snapped into interlocking engagement therewith within said housing while said shade remains sealed pressed against said sealing lip by said wedging branch, and

means preventing further inward movement of said male profile into said housing when said first and second wedging lips are interlocked.

4,987,944

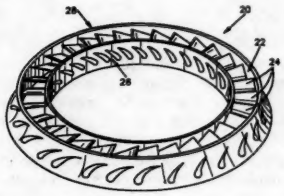
METHOD OF MAKING A TURBINE ENGINE COMPONENT

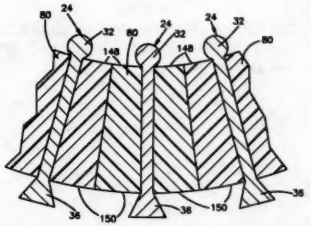
Paul L. Parks, Minerva, Ohio, assignor to PCC Airfoils, Inc., Cleveland, Ohio

Filed Nov. 13, 1989, Ser. No. 436,188

Int. Cl.[5] B22C *9/04, 9/20*

U.S. Cl. 164—10 **74 Claims**





1. A method of making a turbine engine component having a plurality of airfoils disposed in an array, said method comprising the steps of providing a plurality of airfoils, solidifying a first material around and in engagement with the airfoils, solidifying pattern material around and in engagement with the airfoils, said step of solidifying the pattern material around the airfoils including at least partially shaping the pattern material by engagement of the pattern material with the first material and with the airfoils, removing the first material from around the airfoils, thereafter, covering the pattern material with mold material to at least partially form a mold, removing the pattern material from the mold to leave a mold cavity with an end portion of each of the airfoils at least partially disposed in the mold cavity, filling the mold cavity left by removal of the pattern material with molten metal which extends around end portions of the airfoils, and solidifying the molten metal in the mold cavity.

4,987,945

EVAPORABLE FOAM PATTERN ASSEMBLY FOR CASTING A CENTRIFUGAL PUMP HOUSING

William D. Corbett, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

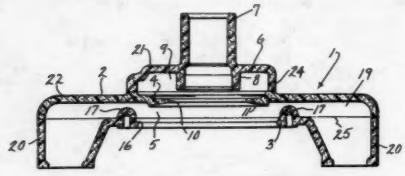
Filed Nov. 30, 1989, Ser. No. 443,904

Int. Cl.[5] B72D *7/02*

U.S. Cl. 164—235 **16 Claims**

1. An evaporable foam pattern assembly for use in casting a pump housing, comprising a housing pattern composed of polymeric foam material and including a pair of opposed outer walls and an annular internal wall disposed within the housing and spaced from said outer walls, the space between a first of said outer walls and said internal wall defining an impeller chamber and the space between the second of said outer walls and said internal wall defining an inlet chamber, said housing having a drive opening concentric with the axis of said impel-

ler chamber and in communication with said impeller chamber, inlet means in said housing and communicating with said inlet chamber, outlet means in said housing and communicating with the periphery of said impeller chamber, said housing pattern comprising three pattern sections having abutting surfaces joined together along a pair of parting lines, said



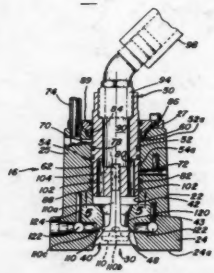
parting lines being parallel and disposed normal to the axis of said impeller chamber, one of said parting lines extending through said impeller chamber and located between said first outer wall and said internal wall and a second of said parting lines extending through said inlet chamber and located between said second outer wall and said internal wall, and joining means for joining the abutting surfaces of said pattern sections.

4,987,946

VALVE FOR MOLD CAVITY GAS REMOVAL SYSTEM

Joannes A. Van Riet, Bedford, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 5, 1989, Ser. No. 402,031
Int. Cl.[5] B22D *17/20*
U.S. Cl. 164—305 **7 Claims**



1. A gas venting valve for use in combination with a material-forming mold or die cavity to control venting of gas through a gas conduit communicating with said cavity, said valve having an open position for allowing gas flow through said conduit and a closed position for preventing the escape of material therepast, said valve comprising:

a housing having a generally cylindrical bore with a longitudinal axis and a portal to said bore disposed axially relative to said bore so as to communicate with said gas conduit and including a valve seat,

a hollow piston slidably received in said bore and having an axially extending gas venting passage in communication with said portal when said valve is in the open position for venting gas from said ,portal, said piston including a first radially extending surface responsive to fluid pressure for moving the piston in a first axial direction and a second radially extending surface responsive to fluid pressure for moving said piston in a second axial direction opposite said first direction,

a valve head located in said portal and connected to said piston for axial movement therewith relative to the valve seat to establish the open position of said valve wherein the valve head is spaced apart axially from the valve seat to allow gas flow therebetween and the closed position of said valve wherein the valve head is sealed against the valve seat,

means for supplying pressurized fluid to said first surface to move the valve to the open position, and

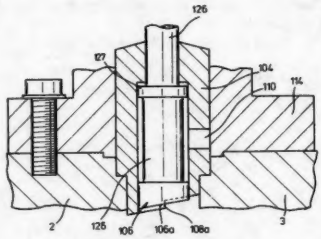
means for supplying pressurized fluid to said second surface to move the valve to the closed position.

4,987,947

GAS VENTING DEVICE FOR MOLDING OPERATIONS

Mamoru Ozeki, Zama, and Akihico Tsuda, Atsugi, both of Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 58,777, Jun. 5, 1987, Pat. No. 4,787,436. This application Nov. 28, 1988, Ser. No. 276,810
The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.
Int. Cl.[5] B22D *17/14*
U.S. Cl. 164—305 **6 Claims**



1. A gas venting arrangement for use with molding apparatus including a mold having a cavity to be filled with a melt, means for injecting melt into the mold cavity and a gas vent passage communicating with the mold cavity for evacuating gas from the mold cavity ahead of advancing melt as it fills the mold cavity, said gas venting arrangement comprising:

a housing having a valve chamber with an inlet adapted to be placed in fluid communication with the gas vent passage, and an exhaust port for evacuating gas from said chamber;

an annular valve seat adjacent said inlet;

a valve body coaxial with said valve chamber and said valve seat and having a valve stem extending rearwardly through said valve chamber away from the mold, said valve body being axially movable forwardly, toward the mold, to open said inlet, and movable rearwardly, away from the mold, to close said inlet in cooperation with said valve seat; and

valve actuation means associated with said housing and operatively coupled to said valve stem for positively driving said valve body rearwardly to positively close said inlet when the mold is full of melt, and permitting said valve body to be driven rearwardly more rapidly by the melt itself to close said inlet if melt advancing through the gas vent passage overtakes the positively driven valve body, wherein a forward face of the valve body and a forward end of the valve seat are machined at an angle to a plane perpendicular to the axis of the valve body and valve stem.

4,987,948

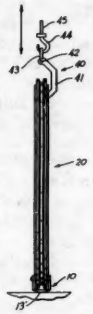
CASTING RING CRADLE

Covert E. Fender; Randy C. Wynn, Sr., and Vernon J. Miller, all of Carroll County, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Nov. 17, 1989, Ser. No. 439,056
Int. Cl.[5] B22D *11/06*
U.S. Cl. 164—433 **8 Claims**

1. In a combination apparatus which comprises a removably

attachable apparatus for receiving, holding, and supporting, and protecting a portion of the periphery of a continuous casting wheel, said wheel comprising a mounting plate, a mould member, and a side plate, while said casting wheel is repositioned from a substantially vertical orientation to a substantially horizontal orientation, the combination apparatus comprising:



a plurality of support members, said members having curved support surfaces, said surfaces contacting and having the same radius as the portion of the periphery of said casting wheel supported by said support surface;

a plurality of fastening means for fastening said apparatus to said casting wheel; and

a plurality of curved bases, said bases being attached to said apparatus and said bases permitting said casting wheel to pivot from a vertical position to a horizontal position.

4,987,949

PROTECTIVE COVER FOR SURFACE OF MOLTEN STEEL USED IN CONTINUOUS CASTING APPARATUS

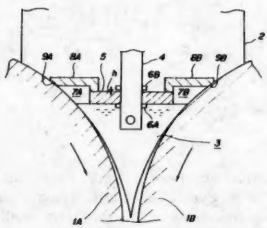
Haruo Sakaguchi, Osaka; Shiromitsu Iwatani, Nara, and Toshikatsu Okao, Osaka, all of Japan, assignors to Hitachi Zosen Corporation, Japan

Filed Jul. 18, 1989, Ser. No. 381,517

Claims priority, application Japan, Jul. 29, 1988, 63-191895; Feb. 21, 1989, 1-41439

Int. Cl.[5] B22D *11/06, 11/10*

U.S. Cl. 164—450 **4 Claims**



1. In a continuous casting apparatus having a pair of movable mold walls arranged in parallel relation to each other and a melt receiver formed between said movable mold walls for accumulating molten metal therein, the improvement of a protective cover for the surface of the molten metal comprising:

a central heat insulator supported between and in spaced relation to said movable mold walls and adapted to contact a central portion of the surface of the molten metal but not to contact the side portions of said surface of the molten metal adjacent to said mold walls, and

side head insulators mounted on said central heat insulator and spaced above said central heat insulator and above said side portions of said surface of the molten metal, said side heat insulators slidably contacting with the surfaces of the respective movable mold walls above said surface of the molten metal.

4,987,950

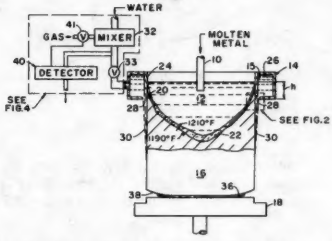
METHOD AND APPARATUS FOR CONTROLLING THE HEAT TRANSFER OF LIQUID COOLANT IN CONTINUOUS CASTING

Ho Yu, Murrysville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 14, 1989, Ser. No. 366,759

Int. Cl.[5] B22D *11/22*

U.S. Cl. 164—455 **71 Claims**



33. A method for continuously casting metal ingots using a liquid coolant, said method comprising the steps of:

casting molten metal into an open-ended mold to form an ingot which emerges therefrom;

providing a liquid for cooling said ingot;

mixing a gas with said liquid coolant so that said liquid contains gas bubbles;

passing light through said liquid onto a light sensing device;

detecting the relative density of bubbles that fall within a reference range from the scattering of said light and generating a signal therefrom;

comparing said number density to a reference signal;

when said generated signal is outside said reference range, varying the relative amount of gas that is being mixed with said liquid coolant to bring said generated signal within said reference range; and

varying said reference range from a first range that is used during the first stages of casting to a second range that is used when said emerging ingot is in a second stage; and

applying said liquid to said ingot emerging from said mold to effect at least partial solidification of the molten metal.

4,987,951

METHOD AND APPARATUS FOR THE VERTICAL CASTING OF METAL MELTS

Walter Dietrich, Hanau am Main, and Klaus-Georg Dietrich, Darmstadt-Wixhausen, both of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,166

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1988, 3829810

Int. Cl.[5] B22D *11/16, 37/00, 41/08*

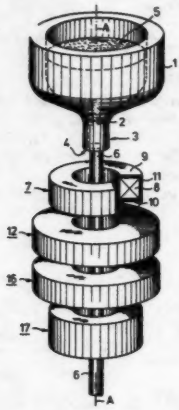
U.S. Cl. 164—466 **9 Claims**

1. A method for casting metal melts from vessels with an outlet opening having a vertical axis, comprising

forming a pouring steam of molten metal along said vertical axis from said outlet opening, and

impressing a rotation in the stream of molten metal by means of a magnetic field which rotates about said vertical axis.

5. Apparatus for casting metal melts comprising a vessel with an outlet opening having a vertical axis, and



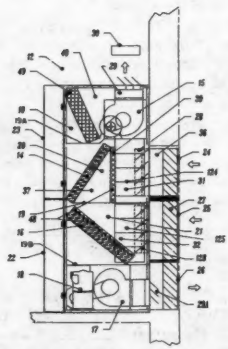
magnetic means for inducing a rotation in a stream of molten metal falling along said vertical axis from said outlet opening, said rotation being induced about said vertical axis.

4,987,952

APPARATUS FOR USE IN DEHUMIDIFYING AND OTHERWISE CONDITIONING AIR WITHIN A ROOM

David E. Beal, Augusta; John W. Dumont, Jr., Monmouth, and Andrew S. Matthews, Lewiston, all of Me., assignors to Dumont Holding Company, Monmouth, Me.

Filed Apr. 26, 1990, Ser. No. 514,874
Int. Cl.[5] F24F *3/14*
U.S. Cl. 165—16 13 Claims



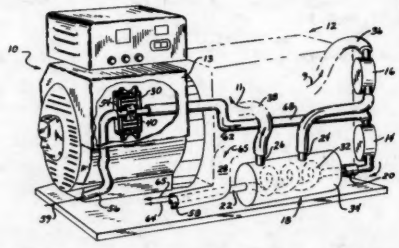
1. Apparatus for dehumidifying and otherwise conditioning the air in a room, said apparatus including a cabinet in the room at the inner side of a wall thereof, two dehumidifier units mounted side by side in the cabinet, each unit having a compressor, condenser, evaporator, condenser fan and evaporator fan, (with) the evaporator and evaporator fan of each above the condenser, condenser fan and compressor thereof, drain pan means below the evaporators and dividing the (units) cabinet into upper and lower sections, a partition separating the evaporators from the evaporator fans, a partition separating the condensers from the condenser fans, said cabinet provided with first, second and third ports opening through the other side of the wall, the first (and second) (port) (ports) port opening into the upper section, the (third) (second) second port opening into the lower section, the first and second ports for the admission of air into the cabinet and the third port for the discharge of air from the condenser (fan) fans, a conditioned air outlet for each unit in the top of the cabinet, and inlet ports in each end of the cabinet to receive air from the room and opening into both sections, separate plenum means, one for each section attached to the cabinet and opening into (both sections) the appropriate section to provide a vertical passageway (between the sections) about the partition therein, a series of normally closed pivotable dampers mounted in the cabinet and operable to control the admission of air through the first port into the upper section, a series of normally open pivotable dampers at each end of the cabinet and operable to control the admission of air from the room into the lower section, means operable to adjust the dampers of each series by turning them from and returning them to their normal positions, at least the adjustments away from their normal positions by increments, humidity and temperature sensing means responsive to the humidity and temperature on both sides of the wall and control means responsive to the sensing means and operable to establish and maintain wanted humidity and temperature conditions within the room by controlling the operation of the units, components thereof and the means by which the several series of dampers are adjusted.

4,987,953

SHARED COOLANT SYSTEM FOR MARINE GENERATOR

Randall J. Hedstrom, Sheboygan, Wis., assignor to Kohler Company, Kohler, Wis.

Filed Mar. 9, 1990, Ser. No. 491,044
Int. Cl.[5] H02P *9/04*; H02K *5/20, 9/00*
U.S. Cl. 165—47 1 Claim



1. An electrical generator powered by an internal combustion engine for producing an electrical current, the generator having a solid state voltage regulator for controlling the output voltage of the generator and the internal combustion engine having a separate coolant system exchanging heat with an external reservoir of water at ambient temperature comprising:

a water receiving means for accepting a water stream from the reservoir;

a first heat exchanger means for conducting heat from the solid state voltage regulator to the water stream;

a second heat exchanger means, for accepting said water stream from the first heat exchanger means and conducting heat from coolant within the internal combustion engine cooling system to the water stream; and

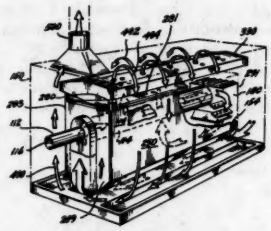
a water outlet means for discharging the water stream received from the second heat exchanger.

4,987,954

FUEL REACTOR

Robert J. Boucher, P.O. Box 985, Bonner, Mont. 59823

Division of Ser. No. 276,884, Nov. 28, 1988, Pat. No. 4,922,839.
This application Mar. 13, 1990, Ser. No. 492,972
Int. Cl.[5] F28F *7/00*
U.S. Cl. 165—138 7 Claims



1. A heat exchanger for extracting heat from a combustion gas producing core comprising:

a gas dispersion shelf positioned above said core acting to distribute the combustion gas at a substantially constant density and providing a thermal barrier above the core for maintaining core temperature;

a radiating heat exchanger plate positioned above said gas dispersion shelf for extracting heat therefrom;

said gas dispersion shelf and said radiating heat exchanger plate being provided with flow holes with said heat exchanger plate positioned with respect to said gas dispersion shelf such that the combustion gas flows through said gas dispersion shelf holes, impinges on the lower surface of said radiating heat exchanger plate and moves laterally there across to the holes therein; and

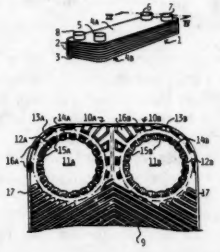
a primary heat exchanger comprising a vessel for containing the heat exchanger medium, said vessel being positioned above said radiating heat exchanger plate and including gas flow tubes extending through said vessel to allow combustion gas flow there through to thereby enhance the transfer of heat from said combustion gas to said vessel and heat exchanger medium.

4,987,955

PERMANENTLY JOINED PLATE HEAT EXCHANGER

Jan-Ove Bergqvist, Malmö, and Jarl Andersson, Lund, both of Sweden, assignors to Alfa-Laval Thermal AB, Tumba, Sweden

PCT No. PCT/SE88/00276, § 371 Date Dec. 28, 1988, § 102(e) Date Dec. 28, 1988, PCT Pub. No. WO88/09473, PCT Pub. Date Dec. 1, 1988
PCT Filed May 25, 1988, Ser. No. 295,216
Claims priority, application Sweden, May 29, 1987, 8702258
Int. Cl.[5] F28F *3/08*
U.S. Cl. 165—167 7 Claims



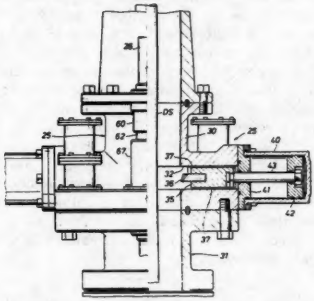
1. Plate heat exchanger comprising a package of heat exchange plates, each having a peripheral portion and within this a heat exchange portion and several port portions with throughflow ports, the heat exchange plates being permanently joined to adjacent heat exchange plates of the package both along their peripheral portions and at a variety of places in their heat exchange portions in such manner that they leave flow passages between adjacent heat exchange plates, the ports of the plates being aligned and forming first inlet and outlet channels through the package for a first heat exchange medium, which communicate with every other flow passage between the heat exchange plates, and second inlet and outlet channels through the package for a second heat exchange medium, which communicate with remaining flow passages between the heat exchange plates, and along each of the inlet and outlet channels the port portions of adjacent heat exchange plates which form a flow passage separated from the inlet and outlet channel, respectively., being permanently joined around the inlet and outlet channel, respectively, between an outer line and an inner line, located closer to the inlet and outlet channel, respectively, characterized by means arranged to keep the port portions of the heat exchange plates together along the inlet and outlet channels, said means being placed along each of the inlet and outlet channels in the plate interspaces communicating with said inlet and outlet channels, respectively, and in each such plate interspace being permanently connected to both of the heat exchange plates delimiting the plate interspace in question in an area around the inlet and outlet channel, respectively., located between said inner line and the inlet or outlet channel, itself.

4,987,956

APPARATUS FOR USE IN DRILLING A WELL AT AN OFFSHORE LOCATION

Asger Hansen, 14655 Champion Forest Dr., #1703, Houston, Tex. 77069, and Martin J. Kelly, Jr., 15622 T. C. Jester Blvd., Houston, Tex. 77069

Filed Aug. 30, 1989, Ser. No. 400,075
Int. Cl.[5] E21B *29/12*
U.S. Cl. 166—361 11 Claims



1. Apparatus for use in drilling a well at an offshore location, comprising

an upper tubular member,

a lower tubular member,

means for releasably connecting the upper and lower members in end-to-end relation, and

means mounted in the upper member for movement across the bore thereof to shear a drill string extending within the bore,

the faces of the ends of the upper and lower members being substantially coplanar, and

the connecting means comprises means extendable from the end face of the upper member into and out of locking engagement with means in the end face of the lower member, whereby, upon shearing of the drill string and movement of the extendable locking means on the end face of the upper member out of locking engagement with the

locking means in the end face of the lower member to release the connection of the members, the end face of the upper member may be moved laterally of the end face of the lower member as the upper sheared end of the drill string is retrieved, and

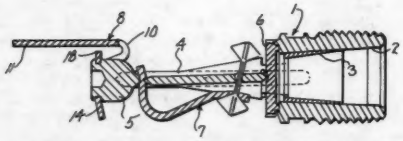
remotely operable means for moving the shear means across the bore of the upper member and then moving the locking means on the end face of the upper member out of locking engagement with the locking means in the end face of the lower member.

4,987,957

DEFLECTOR FOR SIDE WALL SPRINKLER HEAD

William Galaszewski, Brookfield, Wis., assignor to Star Sprinkler Corporation, Milwaukee, Wis.

Filed Oct. 27, 1989, Ser. No. 427,714
Int. Cl.[5] A62C 37/08
U.S. Cl. 169—37 9 Claims



1. A side wall sprinkler head, comprising a body defining an outlet to be connected to a water line and having an axis, a pair of arms extending outwardly from the body and disposed in a common horizontal plane, the outer ends of said arms being connected at a junction, a cap to enclose the outlet, releasable means interconnecting the cap and the junction and constructed and arranged to release said cap to permit discharge of water from said outlet when said releasable means is exposed to a predetermined elevated temperature, a deflector connected to said junction and including a generally vertical section secured to said junction and extending normal to the axis of said outlet, said deflector also including a generally horizontal section connected to the upper edge of said vertical section through a reverse bent area, a first central tine extending downwardly from the lower edge of said vertical section and disposed in a longitudinal vertical plane extending through said axis, a pair of second tines connected to the lower edge of said vertical section and spaced laterally of said first tine, said second tines diverging downwardly and outwardly from said vertical plane, said vertical section having a pair of horizontally elongated openings with each opening disposed above a second tine, said bent area having a horizontally elongated aperture extending laterally to either side of said vertical plane, said second tines being raked rearwardly at an acute angle toward said body, and the lower extremities of said second tines being bent forwardly.

4,987,958

CHIMNEY FIRE EXTINGUISHING APPARATUS

Charles A. Fierbaugh, 168 Midway Dr., Dunbar, W. Va. 25064

Filed Aug. 7, 1989, Ser. No. 390,978
Int. Cl.[5] A62C 37/12
U.S. Cl. 169—57 1 Claim

1. A chimney fire extinguishing apparatus securable to a furnace firebox and associated chimney flue wherein the apparatus comprises,

a fluid reservoir including a first outlet hose operatively associated to a solenoid valve, and

a second outlet hose secured at one end to said solenoid valve and at its other end to a delivery hose, the delivery hose secured in fluid communication with a nozzle, the nozzle positioned interiorly of the furnace firebox, and

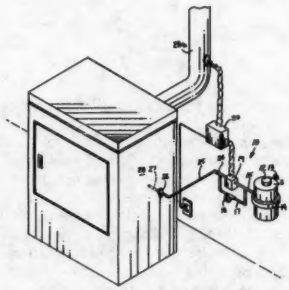
a heat sensing switch means positioned within said flue for sensing elevated predetermined temperatures within said flue to energize said solenoid valve upon sensing of said predetermined temperatures to enable a directing of fluid from said reservoir to said nozzle assembly, and

wherein said delivery hose is flexible to enable orientation of said delivery hose relative to said furnace firebox, and

wherein said heat sensing switch comprises a bi-metallic switch member including a forward end positioned interiorly of said flue in electrical communication with said solenoid through an electrical junction box, and

wherein said nozzle assembly includes a perforated nozzle positioned interiorly of said furnace firebox to direct a fluid spray interiorly of said firebox, and

wherein said nozzle assembly includes a first elongate rigid hose directed interiorly of said firebox and terminating in a "U" shaped forward end, and a second rigid delivery



hose arranged parallel to said first delivery hose and formed with a nozzle at its free end to direct a spray of fluid onto an interior surface of said firebox to effect cooling of said firebox, and

wherein said audible alarm includes a reciprocable rod directed through a lid securable to said reservoir, a lower end of said rod including a float secured thereto and an upper end of said rod including an "L" shaped leg formed thereon, a first electrical contact formed upon a lower surface of said leg in aligment with a second contact integrally secured and directed upwardly of said lid, said first electrical contact mounted for electrical association with said second contact upon a reduced fluid level effected within said reservoir to actuate said alarm.

4,987,959

FARM MACHINE FOR WORKING THE SOIL

Michel Kirch, Etting, France, assignor to Kuhn, S.A., Saverne, France

Filed Mar. 7, 1988, Ser. No. 165,093
Claims priority, application France, Mar. 6, 1987, 8703219
Int. Cl.[5] A01B 33/02
U.S. Cl. 172—124 24 Claims

21. A farm machine for working the soil, said farm machine comprising:

(a) a frame;

(b) hitching means connected to said frame for hitching said machine to a tractor during use of said farm machine;

(c) a rotor having a longitudinal axis that, during use of said machine, is at least approximately parallel to the ground and extends obliquely in relation to a work direction so that said rotor has a forward end and a rearward end considering said work direction, said rotor being equipped with:

(i) a central beam and,

(ii) a plurality of tool units for working the soil fastened to said central beam, each one of said plurality of tool units for working the soil comprising:

(A) a disk fastened to said central beam and having an outside perimeter and a concave face, said concave

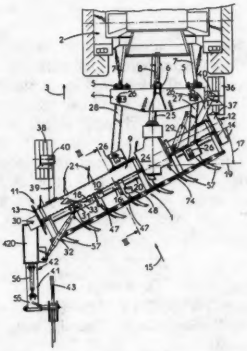
face being directed towards said forward end of said rotor, and

(B) a plurality of soil circumferentially spaced spade members removably fastened to said disk in such a manner that said concave face of said disk remains smooth without any protrusion, each one of said plurality of soil spade members going beyond said outside perimeter of said disk and extending at least approximately in the extension of said disk;

(d) a plurality of scraper-mould board units, each one of said plurality of scraper-mould board units being associated with a corresponding one of said plurality of tool units for working the soil in such a manner that it extends, considering said work direction, behind said central beam and works with said concave face of said disk of said corresponding one of said plurality of tool units for working the soil, each one of said plurality of scraper-mould board units comprising:

(i) a scraper having a scraping edge:

(A) which extends in part at least below an at least approximately horizontal plane containing said longitudinal axis of said rotor;



(B) which extends close to the concave face of the corresponding one of said disks; and

(C) which has an angle of incidence of less than 30°, said scraping edge being sized, shaped, and positioned to scrape soil from the concave face of said disk, and

(ii) a mould board;

(A) which extends from said scraping edge and

(B) which forms an angle of less than 40° with a plane tangential to the curvature of the corresponding one of said plurality of disks and resting on the perimeter of the corresponding one of said plurality of disks in the zone of said scraper-mould board unit, said mould board being sized, shaped, and positioned to turn over the soil dug up by the corresponding soil spade members and transported by the corresponding one of said disks; and

(e) driving means receiving movement, during use, from a power source to rotate said rotor around its longitudinal axis in a direction of rotation such that said plurality of tool units for working the soil are moving forward at their highest positions.

4,987,960

WELL FLUID AND TEST METHOD

Roy K. Darlington, Malvern, Pa., assignor to Baroid Technology, Inc., Houston, Tex.

Filed Sep. 1, 1989, Ser. No. 402,051
Int. Cl.[5] E21B *47/10, 49/08*
U.S. Cl. 175—42 **4 Claims**

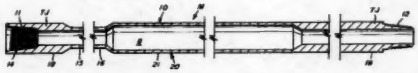
1. A method of determining the dilution of a wellbore fluid by connate water or surface water invasion comprising preparing a wellbore fluid having a known concentration of bromide ion uniformly distributed in such wellbore fluid, using said wellbore fluid in an earth borehole, recovering a sample of said used wellbore fluid, determining quantitatively the concentration of said bromide ion in said recovered sample, comparing the concentration of bromide ion in said recovered sample with said known concentration of said bromide ion in said wellbore fluid, and determining the dilution of said wellbore fluid.

4,987,961

DRILL STEM ARRANGEMENT AND METHOD

Branch M. McNeely, Jr., 5313 Pine, Bellaire, Tex. 77401

Filed Jan. 4, 1990, Ser. No. 461,046
Int. Cl.[5] E21B *7/16*
U.S. Cl. 175—320 **20 Claims**



1. A member for use in a drill string for forming a bore in the earth comprising:

a tubular member having a bore therethrough and including:

tool joints at each end of said tubular member for securing said tubular member in the drill string;

a first portion extending longitudinally of said tubular member from adjacent one of said tool joints, said first portion having an outer diameter smaller than the outer diameter of said tool joints; and

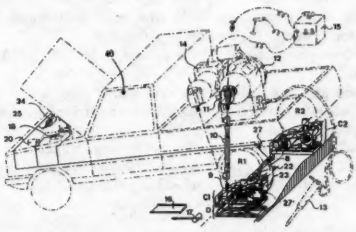
an enlarged portion extending longitudinally of said tubular member from adjacent said first portion to the other of said tool joints, said enlarged portion having outer and inner diameters larger than the outer and inner diameters, respectively of said first portion.

4,987,962

MOTION OR FORCE TAKE-OFF DEVICE FOR MOTOR VEHICLES

Edmond J. P. Purguette, Lycée Paul Cézanne - Avenue Fontenaille, 13100 Aix-en-Provence, France

Filed Jun. 3, 1988, Ser. No. 202,888
Claims priority, application France, Jun. 18, 1987, 87 08685
Int. Cl.[5] B60K *17/20;* G01M *17/00*
U.S. Cl. 180—53.6 **11 Claims**



1. A power transmission device for transmitting power from a motor vehicle wheel to a driven machine, or from a driving machine to said motor vehicle wheel, comprising: a box frame, two parallel pulley shafts mounted for rotation in said box frame, each of said pulley shafts having a cylindrical outside surface extending along an axis, circular shaft ribs disposed on said outside surface which extend in juxtaposed planes perpendicular to said axes, an endless belt extending between and surrounding said pulley shafts, said belt having an inner surface provided with longitudinal juxtaposed belt ribs interfitting with said shaft ribs, said belt having a width at least as great as

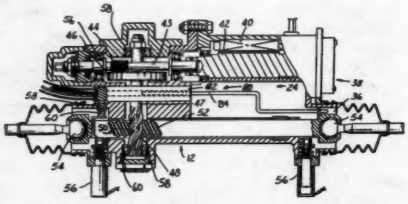
the width of the motor vehicle wheel and having an outside surface frictionally engaging said wheel, a distance between said pulley shafts causing said wheel to bear on said pulley shafts and on a portion of said belt facing said wheel and extending between said pulley shafts, at least one of said pulley shafts being connected to said driven or driving machine, a bottom frame lying under said box frame, said box frame being pivotally mounted on said bottom frame about a swivel axis, said swivel axis being substantially perpendicular to said belt and extending in a plane transverse to said pulley shafts, situated in an axially median region thereof.

4,987,963

STEERING GEAR FOR THE ROADWHEELS OF A VEHICLE

Algis Oslapas, Dearborn Heights, and Manfred Rumpel, Birmingham, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 290,541
Int. Cl.[5] B62D *5/04*
U.S. Cl. 180—79.1 **5 Claims**



1. A steering gear for steering the roadwheels of a vehicle, comprising:

a control module;

a rotary motor, responsive to signals for said control module, for providing power for steering said roadwheels; and

a nonreversible gearset, powered by said motor, for converting rotary motion of said motor into linear motion for steering said roadwheels, with said motor being capable of driving said gearset, but with said gearset being incapable of driving said motor in response to force inputs from said roadwheels into said gearset, said gearset comprising:

a motor pinion attached to a rotating shaft driven by said motor;

a face gear driven by said motor pinion;

a rack pinion coupled to said face gear;

a slidable rack driven by said rack pinion, with each end of said rack being operatively attached to a steerable spindle upon which a roadwheel is journaled;

a worm gear attached to a rotating shaft driven by said motor;

a main drive gear driven by said worm gear;

a drive nut mounted coaxially with and driven by said main drive gear; and

a lead screw driven by said drive nut, with each end of said lead screw being operatively attached to a steerable spindle upon which a roadwheel is journaled.

4,987,964

ELECTRIC POWER STEERING SYSTEM

Hidetoshi Tabuse, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Jul. 25, 1989, Ser. No. 384,603
Claims priority, application Japan, Jul. 30, 1988, 63-191617
Int. Cl.[5] B62D *5/04*
U.S. Cl. 180—79.1 **3 Claims**

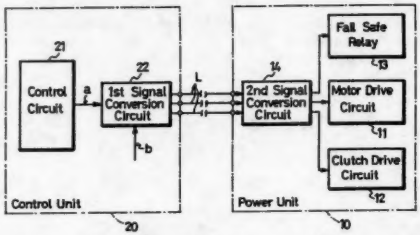
1. An electric power steering system comprising:

a power unit having a plurality of drive circuits for operating electric components of said power steering system;

a control unit having a control circuit for controlling said drive circuits, said control unit being connected to each of said plurality of drive circuits by at least the transmission line, said at least one transmission line having transmitted therethrough logic control signals representing "on" or "off" logic states for controlling said drive circuits;

first signal conversion means, provided in said control unit, for converting a logic control signal representing a first "on" logic state to a pulse signal;

second signal conversion means, provided in said power unit and being connected to said first signal conversion means, for receiving an input signal therefrom through said at



least one transmission line, said second signal conversion means for converting said input signal to a second "on" logic control signal when said input signal is said pulse signal and for converting said input signal to an "off" logic control signal when said input signal is not said pulse signal;

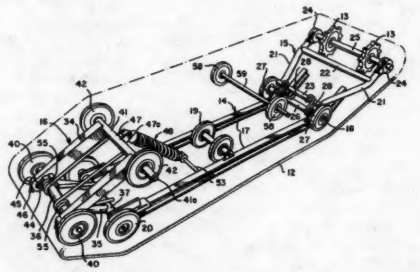
wherein said drive circuits are energized upon receiving said second "on" logic control signal from said second signal conversion means and are deenergized upon receiving said "off" logic control signal from said second signal conversion means.

4,987,965

SNOWMOBILE SUSPENSION

Michel Bourret, Drummondville, Canada, assignor to Bombardier Inc., Canada

Filed Apr. 3, 1990, Ser. No. 503,687
Claims priority, application Canada, Jan. 17, 1990, 2007916
Int. Cl.[5] B62D *55/108*; B62M *27/02*
U.S. Cl. 180—193 **7 Claims**



1. A snowmobile comprising a frame having a forward portion supported on steerable ski means and a rearward portion support on a track belt, said track belt following an endless loop that passes over a forwardly arranged drive sprocket means, through a lower, ground-engaging run to a rearwardly located idler wheel means, and back to the drive sprocket means through an upper return run, said snowmobile including:

a track suspension formed by an elongate slide frame engaging said lower run of the track belt;

a front suspension arm assembly pivotally connected be-

tween a forward portion of said slide frame and the snowmobile frame;

a rear suspension arm assembly pivotally connected between the snowmobile frame and a rearward location on said slide frame

springs acting on said front and rear suspension arm assemblies to urge said slide frame downwardly;

wherein said rear suspension arm assembly comprises rearwardly angulated upper and lower sections that are pivotally interconnected at their adjacent ends and are pivoted at their opposite ends to the snowmobile frame and the slide frame respectively, said idler wheel means being supported on said rear suspension arm assembly to rotate on an axis in the area of the pivotal interconnectional said upper and lower sections thereof.

4,987,966

SLIPPAGE PREVENTING APPARATUS FOR A VEHICLE

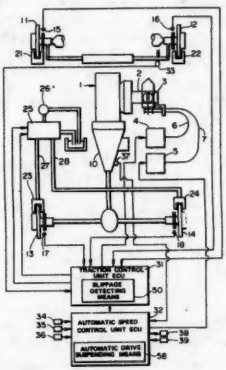
Nagahisa Fujita, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 21, 1988, Ser. No. 222,628

Claims priority, application Japan, Jul. 21, 1987, 62-182823

Int. Cl.[5] B60K *31/000*; F02D *29/000*

U.S. Cl. 180—197 **22 Claims**



1. A slippage preventing apparatus for a vehicle comprising:

output adjusting means for adjusting an output of an engine by increasing or decreasing the output thereof;

slippage detecting means for detecting a degree of slippage on pavement of a driven wheel thereof driven by the engine;

first control means for controlling said output adjusting means to reduce the output of the engine during occurrence of slippage in response to an output from said slippage detecting means;

second control means for controlling said output adjusting means to cause a vehicle speed to reach a given vehicle speed, said second control means being manually actuatable; and

restricting means for restricting operation of said second control means at least during operation of said first control means.

4,987,967

METHOD OF CONTROLLING A FOUR WHEEL DRIVE VEHICLE

Katsumi Kouno, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 83,847, Aug. 10, 1987, Pat. No. 4,884,653. This application Sep. 19, 1989, Ser. No. 409,158

Claims priority, application Japan, Aug. 8, 1986, 61-186495; Dec. 1, 1986, 61-286294

Int. Cl.[5] B60K *17/34*

U.S. Cl. 180—233 **5 Claims**

1. A method for controlling the drive train of a four wheel drive vehicle having an engine and front drive wheels and rear drive wheels, the four wheel drive vehicle including an apparatus for changing a distribution ratio of driving torque between the front wheels and the rear wheels, the apparatus including a transfer mechanism, and a first and a second clutch, the transfer mechanism receiving an output torque from said engine, and distributing the received output torque into two output torque lines connected to said front drive wheels and said rear drive wheels, respectively, the first clutch being located in one of said two output torque lines and transmitting a first amount of the output torque to a front driving shaft connected to said front drive wheels, while the second clutch being located in the other of said two output torque lines and transmitting a second amount of the output torque to a rear driving shaft connected to said rear drive wheels, said method comprising the steps of:

detecting speeds of the front driving shaft and the rear driving shaft;

calculating an actual difference in speed between the detected speeds of said front and rear driving shafts; and

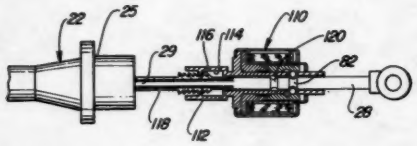
determining said first and second amounts of the output torque transmitted by said first and second clutches to said front and rear driving shafts, respectively, to change an actual distribution ratio of driving torques between said front and rear drive wheels, so that the calculated difference in speed between said front and rear driving shafts is reduced to a desired value.

4,987,968

IN-LINE SOLENOID TRANSMISSION INTERLOCK DEVICE

Charles R. Martus, Troy; Charles A. Detweiler, Durand, and Gerit V. V. Beneker, Auburn Hills, all of Mich., assignors to Lectron Products, Inc., Rochester Hills, Mich.

Continuation of Ser. No. 234,074, Aug. 19, 1988, abandoned.
This application Nov. 17, 1989, Ser. No. 440,414
Int. Cl.[5] B60D 1/28
U.S. Cl. 180—272 14 Claims



1. A cable locking device for a cable assembly having an outer sheath with an axially movable inner core, said locking device selectively permitting or restraining axial movement of said inner core, comprising:

a rod connected at one end to said inner core and at an opposite end to means for generating axial movement of said inner core, said rod having at least one annular groove,

a pole piece surrounding said rod,

an armature surrounding said rod and axially movable between a first position displaced from said pole piece to a second position attracted toward said pole piece,

a solenoid winding surrounding said pole piece and said armature and urging said armature toward one of said first or said second positions when energized,

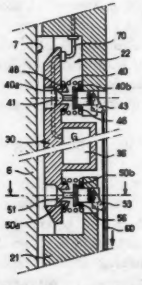
rod locking means operatively associated with said armature for interlockingly engaging said groove in said rod to inhibit axial movement of said rod when said armature is in one of said positions and disengaging said groove in said rod to permit said axial movement when said armature is in the other of said positions.

4,987,969

METHOD OF COUPLING A SEISMIC DETECTOR MODULE TO THE WALL OF A BOREHOLE AND A SONDE FOR IMPLEMENTING THE METHOD

Bruce W. Boyle, Sugar Land, Tex.; Claude Stanisiere, Clamart, and Alain Delpuech, Robinson, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 231,093, Aug. 11, 1988, abandoned.
This application Feb. 20, 1990, Ser. No. 483,347
Claims priority, application France, Aug. 13, 1987, 87 11526
Int. Cl.[5] G01V 1/00, 1/40
U.S. Cl. 181—102 10 Claims



1. In a logging sonde adapted for displacement in a borehole traversing an earth formation, a method of coupling a seismic detector module to the wall of a borehole in order to receive acoustic waves transmitted through the earth, the module being, while in a retracted position, disposed inside a lateral cavity provided in the sonde, the sonde being suspended from a cable, said module being resiliently connected to the sonde via spring means which acoustically isolates said module from the sonde, said sonde also comprising means for retracting including a retracting member operatively connectable to said spring means, and a translocatable member movably connected to said retracting member said method comprising the steps of:

pressing the face of sonde which includes said lateral cavity against the wall of the borehole thereby holding the sonde stationary, while maintaining said spring means in a compressed position so as to maintain said module in said retracted position;

releasing said spring means for its compressed position thereby causing said spring means to be extended, the resulting extension of said spring means causing said module to be displaced from its retracted position in said cavity into contact with the borehole wall;

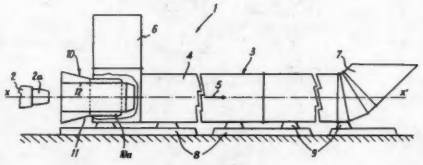
maintaining said spring means in its extended position for pressing the module against the wall of the borehole, the force developed by said spring means while in its extended position being sufficient to acoustically couple said module to the borehole wall and wherein translocation of said translocation member in a first direction allows said spring means to expand and translocation in a second direction causes said retracting member to contract said spring means.

4,987,970

DEVICE FOR COLLECTING THE EXHAUST GAS JET OF AN AIRCRAFT REACTOR AND A TESTING INSTALLATION FOR AIRCRAFT REACTORS

Jean-Paul Boet, Villeneuve d'Asco, France, assignor to Societe Anonyme dite: S. A. Andre Boet, Villeneuve d'Asco, France

Filed Dec. 13, 1988, Ser. No. 283,919
Claims priority, application France, Jun. 17, 1988, 88 08164
Int. Cl.[5] B64E 1/26
U.S. Cl. 181—217 15 Claims



1. A ground testing installation for an aircraft reactor having a longitudinal axis and a propulsion nozzle orientable with respect to the longitudinal axis of said reactor, the installation comprising:

a silencer, having a body of a generally cylindrical elongate shape, for positioning behind a propulsion nozzle of said reactor, and

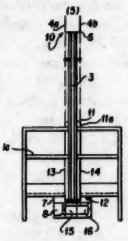
a device for collecting an exhaust gas jet of the reactor, disposed between the reactor and the silencer, said device having an external jacket with a generally cylindrical shape and a bell-mouthed intake end adapted to be situated opposite the propulsion nozzle, and an internal jacket of a generally cylindrical shape having an interior volume and concentric to said external jacket to straighten out the exhaust gas jet when the propulsion nozzle of the reactor has a slant with respect to the longitudinal axis of said reactor, said internal jacket comprising coils that define a hollow volume for receiving cooling fluid for cooling exhaust gas passing through said interior volume.

4,987,971

ARRANGEMENT IN HANGING CRADLES

Ture Hedström, Enskiftesvägen 68, 145 60 Norsborg, Sweden

Filed Mar. 17, 1989, Ser. No. 324,655
Claims priority, application Sweden, Mar. 17, 1988, 8800976; Nov. 22, 1988, 8804217
Int. Cl.[5] A01M *31/02*; A45F *3/26*
U.S. Cl. 182—142 16 Claims



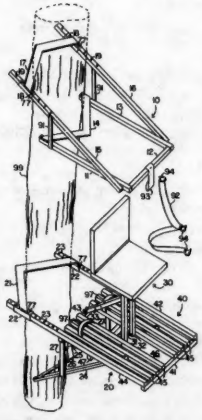
1. A hanging cradle arrangement which comprises: a working platform; a post which extends upwardly from said working platform and which is intended to work with a line; a first attachment for said line located above an upper free part of the post; a guide for said line located on the free part of the post; a second attachment for said line located beneath said guide; and means for raising and lowering the working platform by changing the distance between said guide and said first attachment with the aid of a line activating machine, characterized in that the arrangement includes means for further raising of said working platform such that the distance between said working platform and the upper free part of the post can be decreased when said upper free part of the post is in co-action with said first attachment, and in that the post is in torsionally rigid co-action with the working platform.

4,987,972

TREE CLIMBING APPARATUS

James K. Helms, 9780 Creekfront Rd., #202, Jacksonville, Fla. 32256

Filed May 10, 1989, Ser. No. 349,635
Int. Cl.[5] E04G *3/00*
U.S. Cl. 182—187 7 Claims



1. An apparatus for climbing a tree or like vertical structure and providing an horizontal platform capable of supporting a human, comprising two separate climbing assemblies, an upper climbing assembly and a lower climbing assembly, used in conjunction to perform the tree climbing operation;

said upper climbing assembly comprising two opposed gripping members in non-planar relationship, adapted to engage said tree between said gripping members; and further comprising a substantially rectangular frame having an unobstructed interior portion;

said lower climbing assembly comprising two opposed gripping members in non-planar relationship, adapted to engage said tree between said gripping members; further comprising a collapsible seating assembly having pivoting leg members and a seat rotatably attached to said leg members, where said seating assembly can be maintained in either an upright o collapsed position; and further comprising a substantially planar platform, said platform having a gap adapted to receive said leg members when said seating assembly is collapsed, whereby the upper surface of said leg members and said platform are even and no portion of said seating assembly obstructs any portion of said platform;

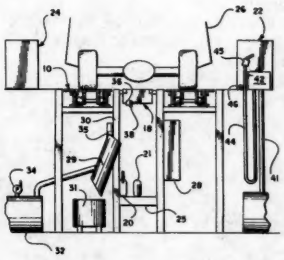
where said seating assembly is set in the collapsed position during the climbing operation, and can be interchangeably set in either the upright or collapsed position when said apparatus is in use as an horizontal platform.

4,987,973

AUTOMOBILE SERVICING SYSTEM

Ralph F. Cody, 10865 Hutcheson Ferry Rd., Palmetto, Ga. 30268

Filed Feb. 22, 1990, Ser. No. 483,127
Int. Cl.[5] F16N *33/00*
U.S. Cl. 184—1.5 10 Claims



1. Automobile servicing apparatus comprising conveyor means for receiving at least one automobile thereon for servicing, said conveyor means including a pair of parallel chains and defining a pit between said pair of chains, pan means movable with an automobile on said conveyor means for receiving fluid draining from the automobile, and at least one fluid delivery means for replenishing fluids in the automobile as the automobile moves along said conveyor means.

4,987,974

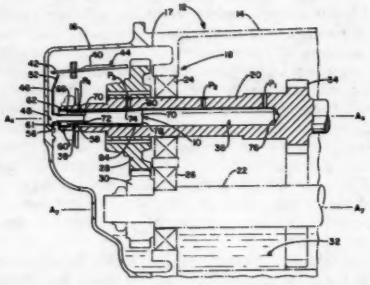
DEVICE TO ASSIST WITH THE RADIAL DISTRIBUTION OF LUBRICATING FLUID FROM A ROTATING SHAFT

Donald G. Crouch, Royal Oak, Mich., assignor to Saturn Corporation, Troy, Mich.

Filed Dec. 11, 1989, Ser. No. 448,472
Int. Cl.[5] F16C *3/14*
U.S. Cl. 184—6.12 11 Claims

1. A device for assisting with the radial distribution of a fluid from a rotating shaft having an axially oriented blind bore opening through one end of the shaft and a plurality of discharge ports opening radially outwardly through the shaft, the discharge ports spaced axially along the blind bore to effect communication between the blind bore and the exterior of the shaft, said device comprising: means provided on the device to retain the device for rotation with said rotating shaft within the

axially oriented blind bore with said device overlying at least one of said discharge ports; a constriction presented from the device; said constriction located interiorly of the axially oriented blind bore when the device is received within the bore; a flared portion tapering axially outwardly from said constriction and extending inwardly along the blind bore to a terminal end portion; a spacer flange extending radially outwardly from said terminal end portion to engage the axially oriented blind bore; and, said spacer flange being circumferentially discontinuous for permitting controlled fluid distribution to said discharge ports overlain by said device.

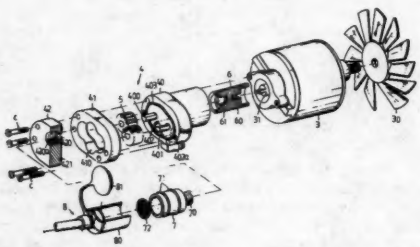


4,987,975

PORTABLE AUTOMOBILE GREASE SUCTION MACHINE

Chen C. Liu, No.9, Lane 119, Section 3, Ho Ping East Road, Taipei, Taiwan

Filed Apr. 17, 1990, Ser. No. 509,745
Int. Cl.[5] F01M *11/04*
U.S. Cl. 184—105.1 **1 Claim**



1. A portable automobile grease suction machine, which comprises:

an upper and a lower shell, the two of which are of a symmetrical shape which is roughly similar to that of a portable air dryer and having set in its interior a blade accomodation chamber, a motor accomodation chamber, a gear pump case accomodation chamber, a grease discharge guiding groove, a motor radiator hole, a gear pump case radiator hole, a starting switch at a spot close to the edge of the handle grip, a hanging hole on the front edge of the handle and, at the same time, the separate setting of an attachment connecting hole and an inverted hanging convexed block;

a motor, which is of a compact type of cylindrical body, with a rotating shaft at one of its end fixed with a blade of an output shaft and the other end being in a shape of a straight-lined stroke;

a gear pump case assembled by a front, a middle and a rear gear pump cases, in which the front gear pump case is to connect with the output shaft and a gear unit; a part of the output shaft is in a shape of a protruded cylindrical body, having set in its interior a main drive shaft of which a front end plane is in a shape of a straight-lined stroke, and a driven shaft is set on its rear end plane; an L shaped grease discharge hole is set at a space in between the main and driven shafts; a semi-protruded anti-leakage sealed ring is set at the outer periphery of the main drive shaft and the driven shaft; and the middle gear pump case being in a shape of a chip which is similar in dimension to that of an oval shaped of the front gear pump case, having set in the middle gear pump case a jointly formed cross-shaped hole to accomodate the gear unit, a grease suction hole and the L-shaped grease discharge hole; on the other hand, the rear gear pump case is similar in its outer appearance and size to those of the middle gear pump; and a ladder-shaped grease suction hole is set at a place where it connects with the grease suction hole; in an interior of a large bore path of said ladder-shaped grease suction hole threads are set; also set on a position which corresponds to the semi-protruded anti-leakage sealed ring on the front gear pump case is a gear case which is assembled by the semi-protruded anti-leakage sealed ring, the front, the middle and the rear gear pump cases, which makes use of a gear shift connecting link to connect itself with the output shaft of the motor;

the gear shift connecting link is designed to meet with the requirement for the high precision connection of the output shaft with the main drive shaft in the gear pump case; the gear shift connecting link is made in the shape of a cylindrical body, having two inter-perpendicular straight-lined strokes separately set in two end openings;

a grease suction pipe joint assembled by circular pipes of various diameters, having two semiprotruded anti-leakage sealed rings set on a large pipe and is also having the setting in the interior of the opening of the large pipe a filtering net which has a pulling handle in a central position, which is to be connected by screws with the ladder-shaped grease suction hole on the rear gear pump case by means of threads on a small pipe;

a grease suction pipe, which is a sleeve joint the front end of which can be sleeved with the forementioned joint, having an end in the interior of its pipe rolled into a ring-shaped wire net and squeezed against the interior of the sleeve joint, so as to prevent the suction pipe from falling off and also to prevent it from bending; and

a grease discharge pipe which is a pipe used to connect with the sleeve joint of the discharge, having a bending supplementary member sleeved to the outlet and of the upper and the lower shell body, having also a sucking disk set at its extreme end.

4,987,976

TELESCOPING PORTABLE LIFT

Andrew H. Daugherty, Hammond, Ind., assignor to Vermette Machine Company, Inc., Hammond, Ind.

Filed Jun. 30, 1986, Ser. No. 880,123
Int. Cl.[5] B66B *9/20*
U.S. Cl. 187—11 **7 Claims**

1. In a portable lift, for being positioned on a working surface or floor, comprising:

a base unit having contacting means for contacting the working surface or floor;

a post assembly mounted on said base unit and having a front and back side;

a platform unit mounted to move up and down the front side of said post assembly;

a winch mounted to said base and post assembly combination at the back side of said post assembly and including a winch cable which is coupled to move said platform unit;

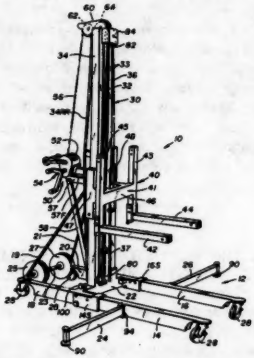
said base including extension rails which project in front of said post assembly; the improvement of:

having said extension rails pivotably secured to the rest of said base at a position just in front of said post assembly, so as to be pivotable upward from an operational horizon-

tally extended position just above the working surface or floor to a vertical storage position wherein they are generally parallel to the post assembly;

means for releasably securing the extension rails in said operational position and alternatively in said storage position; and

a wheel mounted on each of said pivotable extension rails, so



as to pivotably move downward a short distance from a storage position above and out of contact with the working surface or floor to an operational position in which said wheel contacts the operational position in which said wheel contacts the working surface or floor and aids in supporting said base on the working surface or floor as said rail is pivoted upward from its operational position to its storage position.

4,987,977

CONTROL APPARATUS FOR A.C. ELEVATOR

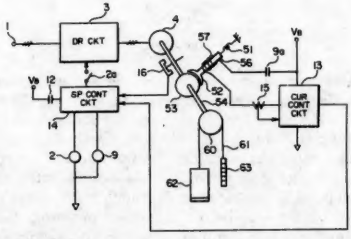
Masami Nomura, Inazawa City, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 1, 1989, Ser. No. 429,992

Claims priority, application Japan, Dec. 23, 1988, 63-325271

Int. Cl.[5] B66B *1/06*

U.S. Cl. 187—112 **2 Claims**



1. A control apparatus for an A.C. elevator having a drive motor to move a cage and a brake wherein a braking force is generated by deenergizing a brake coil to restrain the cage, while the braking force is released by energizing the brake coil in response to a start command signal; said control apparatus comprising:

a current control circuit having

a current command generator which generates a command for current supplied to said brake coil, which compares the current command with a current value detected

a current detector which detects the brake coil current and produces a signal used by said current control circuit to operate said current command generator and to control the brake coil current, and

a velocity control circuit which produces a velocity command to control torque generated by the drive motor in accordance with the load in the cage.

4,987,978

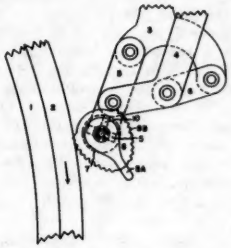
WHEELCHAIR SAFETY BRAKES

Thoger G. Jungersen, Rte. 2, Box 94-R, Concord, Va. 24538

Filed Oct. 10, 1989, Ser. No. 419,516

Int. Cl.[5] B60T *1/04*

U.S. Cl. 188—2 F **3 Claims**



1. A safety brake mechanism for a wheelchair to prevent rollback when the user changes position of the hands while ascending an incline, such as a ramp, permitting the user to selectively travel forward only or backward only, comprising a frame attached to the wheelchair, a brake handle pivoted to the frame, a core member attached to the lever adjacent the tire of the wheelchair, an oval shaped housing having a serrated cam surface on opposite sides thereof, the housing being rotatably mounted on the core member, the core member having two activating cam segments, one for forward movement only, one for backward movement only, for cooperating with the housing for positioning thereof, a spring activated mechanism engaging either cam segment for locating the housing as described by the wheelchair user, actuation of the housing by the user causing one or the other of the serrated cam surfaces to contact the tire of the wheelchair in a manner permitting the serrated cam to slide over the surface of the tire in one direcion while engaging the tire to stop movement in the other direction.

4,987,979

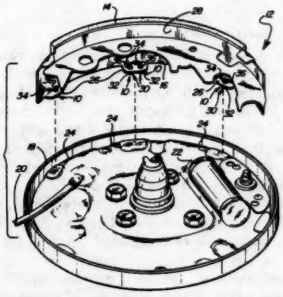
ANTI-SQUEAK BUMPERS FOR BRAKES

Thomas Wicks, Chelsea, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Feb. 5, 1990, Ser. No. 474,892

Int. Cl.[5] F16D *69/00*

U.S. Cl. 188—250 E **7 Claims**



1. A vehicle drum brake assembly (12) for selectively applying pressure to a rotating drum, said assembly comprising:

rotating drum means for receiving a braking force to stop the vehicle;

lining means (14) for frictionally engaging said rotating drum means;

brake shoe means (16) supporting said lining means (14), the brake shoe means having a main face (28) on the side opposite said lining means (14) upon which a brake shoe web is supported centrally thereof;

backing plate means (18) for moveably supporting said brake shoe means (16);

said backing plate means (18) including platform means (24) for properly spacing said brake shoe means (16) from said backing plate means (18);

tab means (26) fixedly attached to said brake shoe means (16) along an edge thereof spaced from said web and substantially perpendicular to the main face (28) for engaging said platform means (24), said assembly characterized by

spacer means (10) secured to the tab means (26) and disposed between said tab means (26) and said platform means (24), the spacer means (10) including head means (30) secured to the tab means (26) on a side thereof remote from the web to extend into contact with the platform means (24), the spacer means (10) including anchor means (34) extending from the head means (30) received by said tab means (26) for securement thereto, the spacer means (10) being fabricated of an organic polymeric material to reduce vibrational noise.

4,987,980

LOCK-UP DAMPER DEVICE FOR TORQUE CONVERTER

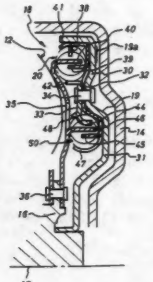
Shinji Fujimoto, Neyagawa, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Continuation of Ser. No. 362,425, Apr. 19, 1989, abandoned. This application Jun. 20, 1990, Ser. No. 541,175

Claims priority, application Japan, Sep. 11, 1987, 62-229176; Sep. 11, 1987, 62-139674[U]

Int. Cl.[5] F16H *45/02*; F16D *3/12*

U.S. Cl. 192—3.28 **5 Claims**



1. A lock-up damper device for a torque converter having a front cover, an output shaft and a turbine having a turbine hub mounted on said output shaft, said damper device comprising a piston mounted axially movable and circumferentially movable through a limited angle of rotation on said turbine hub and disposed axially between said turbine and said front cover,

a friction facing on said piston for engagement with said front cover when said piston is moved axially on said turbine hub toward said front cover,

a driven plate positioned axially between said turbine and said piston, said driven plate having a radial inner end and being fixed adjacent said radial inner end to said turbine hub,

a retainer plate and a side plate disposed axially intermediate said piston and said driven plate and secured to each other and to said piston by a common securing means,

said retainer plate and said side plate having a plurality of circumferentially spaced outer torsion spring holders formed thereon,

said retainer plate and said side plate having a plurality of circumferentially spaced inner torsion spring holders formed thereon,

a plurality of outer and inner torsion springs mounted on said retainer plate and said side plate in said outer torsion spring holders and said inner torsion spring holders, respectively, and

a plurality of projections on said driven plate, said retaining plate and said side plate, said projections engaging opposite ends of said inner and outer torsion springs, said springs being progressively compressed when said friction facing on said piston is engaged with said cover and transmitting torque from said piston to said turbine when said friction facing is engaged with said cover and allowing said limited relative rotation between said piston and said turbine.

4,987,981

TORQUE TRANSMISSION WITH A HYDRAULIC COUPLING UNIT AND LOCKING CLUTCH

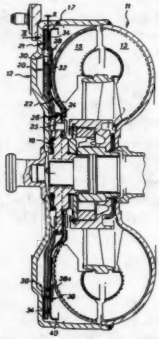
Pierre Casse, Ermont, and Jean-Claude Bochot, Claye Souilly, both of France, assignors to Valeo, Paris, France

Filed Aug. 10, 1989, Ser. No. 391,964

Claims priority, application France, Aug. 30, 1988, 88 11367

Int. Cl.[5] F16H *45/02*

U.S. Cl. 192—3.29 **6 Claims**

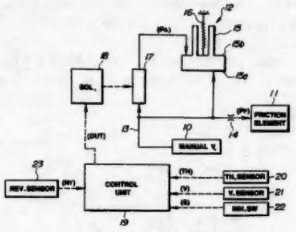


1. A torque transmission comprising an input element, an output element, a hydraulic coupling unit operatively connected between said input element and said output element, and a locking clutch for releasably mechanically coupling the input element directly with the output element, the transmission further including a hub, and said locking clutch including a clutch plate, means securing the clutch plate to said hub, and a piston having a cylindrically surface mounting the piston slidably on said hub, the transmission further comprising friction pad means between one part of the transmission comprising said input or output element on the one hand, and said piston on the other, whereby the piston can engage against said transmission part through the friction pad means, the transmission further comprising purified coupling means arranged between said piston and clutch plate, for coupling said piston and clutch plate together for simultaneous rotation while permitting limited axial translation of said piston, said profiled coupling means comprising a plurality of obsess formed in said piston together with radially elongated slots formed in said clutch plate, with each boss engaging in a corresponding said slot, the clutch plate being axially resiliently deformable, and said clutch plate having a plurality of abutment bosses spaced apart at regular intervals and projecting towards said piston.

4,987,982
SYSTEM FOR ALLEVIATING SELECT SHOCK IN AUTOMATIC TRANSMISSION

Hiroshi Yamaguchi, Yokohama City, Japan, assignor to Nissan Motor Company, Limited, Yokohama City, Japan

Filed Oct. 17, 1988, Ser. No. 258,274
Claims priority, application Japan, Oct. 16, 1987, 62-259774
Int. Cl.[5] B60K *41/22*
U.S. Cl. 192—3.57 **13 Claims**



1. A system for alleviating a gear select shock occurring in an automatic transmission having a transmission input shaft and a transmission output shaft, the system comprising:

a predetermined friction element that is brought into engagement in response to a servo activating hydraulic fluid pressure build-up caused by supply of hydraulic fluid thereto;

a manual selector valve having a neutral range position and a plurality of drive range positions, said manual selector valve allowing a supply of hydraulic fluid to said predetermined friction element at a first instant when said manual selector valve is shifted from said neutral range position to one of said plurality of drive range positions;

an accumulator including an accumulator piston with a pressure acting area which said servo activating hydraulic fluid pressure acts on, said accumulator piston being operative to stroke in response to said servo activating hydraulic fluid pressure thereby to control a rise of said servo activating hydaulic fluid pressure, the accumulator being operatively disposed between the manual selection valve and the friction element;

accumulator control valve means for delivering an accumulator back-up pressure acting on the accumulator piston in opposed relationship with said servo activating hydraulic fluid pressure; and

control means for urging said accumulator control valve means to increase said accumulator back-up pressure during a length of time from said first instant to a second instant when said predetermined friction element is brought into the initial engagement stage, and to subsequently decrease said accumulator back-up pressure after said second instant, whereby said length of time is shortened to effectively alleviate the select shock.

4,987,983
DUAL-MODE POWERED CLUTCH ACTUATOR

Madison B. Adams, 9439 San Jose Blvd., Jacksonville, Fla. 32217

Filed Jul. 17, 1989, Ser. No. 380,290
Int. Cl.[5] F16D *67/02, 23/12*
U.S. Cl. 192—13 R **30 Claims**

1. In a clutch mechanism comprising a clutch pedal means and a movable clutch plate means, said clutch pedal means having a predetermined length of stroke for operating said clutch plate means in response to manual forces adapted to be applied to said pedal means, a clutch actuator including first linkage means between said pedal means and said plate means for transmitting movement of said pedal means to said plate means, selective means operatively coupled to said first linkage means to vary the extent of movement thereof for reducing said stroke of said pedal means when said selective means has been selected to provide a reduced stroke, first power means operably connected to said first linkage means and being responsive to movement thereof for forcibly transmitting movement of said pedal means in response to applied manual forces to said pedal means through both said stroke and said reduced stroke, said selective means including manually operable second power means connected to said first linkage means, said second power means being operated to reduce the stroke of said pedal means required to disengage said plate means, said first power means and said first linkage means being connected and performing the work of moving said clutch plate means during manual operation of said clutch pedal means through both said stroke and said reduced stroke.

17. In a clutch mechanism comprising a clutch brake means, a clutch plate means and a clutch pedal means, said clutch pedal means having a first stroke length for disengaging said clutch plate means and a second stroke length for engaging said clutch brake means, said second length being greater than said first length, a clutch actuator including first linkage means operably connected between said pedal means and said clutch

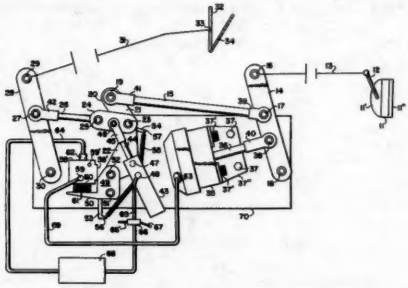


plate means and said clutch brake means for transmitting movement of said pedal means to said plate means and said brake means, selective means operatively coupled to said first linkage means for restricting the movement thereof for reducing the first stroke length to a third shorter stroke length when said selective means has been selected, first power means operably connected to said first linkage means and being responsive to movement thereof for forcibly transmitting movement of said pedal means in response to applied manual forces to said plate means, said brake means including a brake operatively connected to said clutch plate means and engagable by movement of said clutch pedal means through said second stroke length, said selective means including second power means connected to said first linkage means and being operated to reduce said first stroke length to said third stroke length, said first power means and said first linkage means performing the work of moving said clutch plate during manual operation of said clutch pedal, said second power means restricting the movement of said first linkage means when said third shorter stroke length has been selected to inhibit engagement of said brake means by said clutch plate means.

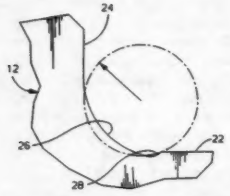
4,987,984
CAM RACE FOR A ROLLER CLUTCH

Charles H. McCreary, Oak Park, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 11, 1990, Ser. No. 463,700
Int. Cl.[5] F16D *41/06*
U.S. Cl. 192—45 **3 Claims**

1. In a roller clutch of the type having a cam race with a plurality of cam slots machined therein, each cam slot comprising a cam ramp of predetermined length and bordered by a pair of side walls circumferentially spaced from said end points, an improved corner transition, between said cam ramp and at least one side wall, comprising,

an astroid curve machined into said cam race so as to be tangent to a respective side wall,



whereby less cam race material is removed to form said corner transition than an equivalent circular arc.

4,987,985

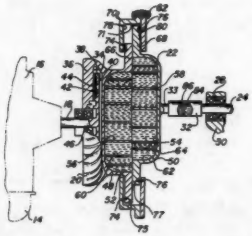
AUTOMOTIVE FAN DRIVE TRAIN ASSEMBLY HAVING A HYDRAULIC COUPLER AND A VISCOUS CLUTCH

Richard J. Meckstroth, and James R. Clarke, both of Northville, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 30, 1989, Ser. No. 428,572

Int. Cl.[5] F16D *39/00*

U.S. Cl. 192—58 A **20 Claims**



1. A fan drive train assembly for an engine of an automobile comprising:

a first shaft adapted to be driven by said engine;

a clutch having a first axis "X" about which said clutch is rotated, said clutch being connected to the first shaft for rotation;

a second shaft;

a fan blade connected to said second shaft, said second shaft having a second axis "Y" offsettable from axial alignment with the first axis X of said clutch and about which said second shaft is rotated;

a shroud enclosing the periphery of the fan blade and adapted for mounting to said automobile;

a bearing assembly connecting said shroud and said second shaft; and

means for coupling said clutch and said second shaft within a predetermined range of radial offsets of said first and second shafts.

4,987,986

ELECTROMAGNETICALLY ACTUATED VALVE PLATE FOR A VISCOUS FLUID FAN CLUTCH

Lawrence C. Kennedy, Kettering, and James O. Strader, Jr., Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 24, 1989, Ser. No. 383,677

Int. Cl.[5] F16D *35/00*

U.S. Cl. 192—58 B **2 Claims**

1. A bladed fan and viscous fluid clutch assembly for inducing a flow of cooling air through a radiator in which engine coolant is circulated, the assembly comprising:

(a) an input shaft adapted to be rotatably driven;

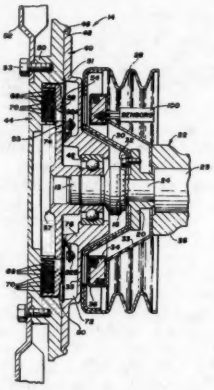
(b) a clutch plate, rotatably driven by the input shaft, having a plurality of axially extending and concentric lands forming grooves therebetween;

(c) a body, rotatably mounted on the input shaft, having a plurality of axially extending and concentric lands forming grooves therebetween, the body lands and grooves mated with the clutch plate lands and grooves to form a shear zone;

(d) axial flow passages in the lands and grooves of the clutch plate to permit the flow of fluid from a reservoir to the shear zone;

(e) a pump plate separating the reservoir from a receiving chamber, the receiving chamber receiving fluid exiting from the shear zone;

(f) gate means provided in the pump plate for permitting the passage of fluid from the reservoir to the shear zone;



(g) orifice means provided in the pump plate for permitting the passage of fluid from the receiving chamber to the reservoir;

(h) a flexible, ferromagnetic valve plate fixedly trapped between the pump plate and the body for controlling fluid flow through the gate means, wherein the valve plate comprises

an inner region trapped between the pump plate and the body;

an outer region having a plurality of arcuate slots; and

an angled ramp connecting the inner region with the outer region; and

(i) means for creating a magnetic flux capable of attracting at least a portion of the valve plate to open the gate means.

4,987,987

TORSIONAL VIBRATION DAMPING MECHANISM

Gerald D. Damon, Farmington, and David P. Godlew, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 87,587, Aug. 20, 1987, Pat. No. 4,874,074.

This application Aug. 3, 1989, Ser. No. 388,933

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] F16D *3/52, 3/80*

U.S. Cl. 192—106.1 **5 Claims**

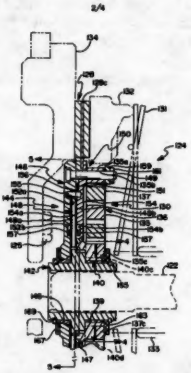
1. A torsional vibration damping mechanism adapted to be rotationally interposed in a driveline between an output drive of a prime mover and an input drive of a transmission having in-gear and neutral positions respectively connecting and disconnecting the input drive with a load; the mechanism comprising:

first and second assemblies disposed for relative rotation about a common axis, the first assembly adapted for selective driving connection to the prime mover drive via a

friction ring, and the second assembly being an annular hub member adapted to be splined to the transmission input drive;

an intermediate means disposed between the assemblies, the intermediate means including a plurality of internal spline teeth mating with a plurality of external spline teeth defined by the hub member, the internal and external teeth having a predetermined amount of circumferential free play therebetween;

spring means comprising at least two spiral wound springs having a relatively high spring rate and disposed in parallel with each other, the springs each including a radially



outer end connected to the first assembly and a radially inner end connected to the intermediate means;

idle rattle springs having a relatively low spring rate and resiliently disposed between the intermediate means and the hub member for resiliently opposing the free play between the spline teeth; and

a viscous shear damper assembly including housing and clutch assemblies mounted for relative rotation and respectively connected to the first assembly and the hub member of the second assembly, the clutch assembly disposed in a chamber defined by the housing assembly and being in viscous shear clutching coaction therewith in response to flexing of either of the spring sets.

4,987,988

REFUSE RECYCLER

Joesph Messina, 128 Brighton' Ave., Staten Island, N.Y. 10301, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

Filed Apr. 17, 1989, Ser. No. 339,515
Int. Cl.[5] B56G *11/12*
U.S. Cl. 193—2 R **3 Claims**

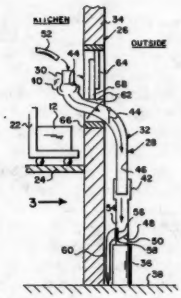
1. Refuse collecting and conveying apparatus for trash to be recycled comprising:

(a) means for collecting various types of trash in separate containers installed in a building and

(b) a plurality of parallel spaced apart elongated ducts installed in the building each for conveying trash from each said container installed in a building each for conveying trash from each said container, each duct having an interior receiving segment inside said building and an exterior segment extending outside said building to respective trash cans below at ground level so that the trash in each of said containers can be dumped within said receiving segment of one of said ducts and conveyed into its respective trash can, outside said building, in combination with means for washing the ducts, wherein each of said ducts further comprises:

(c) said receiving segment having a hollow ball joint connection so that said receiving segment can be adjusted thereto;

(d) said exterior segment having a telescopic portion so that said exterior segment can be vertically adjusted to height of said building; and



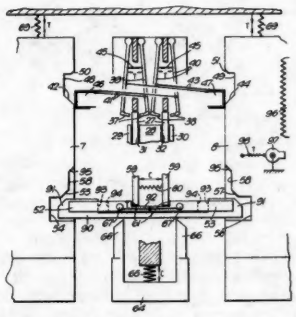
(e) a pair of check gates, one carried in said receiving segment while the other is carried in said exterior segment for sealing a passageway therethrough while allowing weight of the trash to pass by and enter its respective trash can.

4,987,989

COIN-FREED VENDING MACHINE MECHANISM

Nicholas H. Buckenham, Red Wing, Headley Heath Approach, Box Hill Road, Tadworth, Surrey, England LT20 7LQ; Robert W. Tansley, 1 Chapel Street, Harbury, Warwickshire, England CB33 9HT, and Hans H. Petersen, 101 Norwich Street, Cambridge, England CB2 1ND

Continuation of Ser. No. 307,188, Jul. 24, 1989, abandoned, which is a continuation of Ser. No. 760,621, Jul. 30, 1985, abandoned. This application Jul. 23, 1990, Ser. No. 556,855
Int. Cl.[5] G07F *5/14, 5/26, 11/46*
U.S. Cl. 194—237 **11 Claims**



1. A mechanical coin-freed dispensing mechanism comprising:

(a) coin measuring apparatus including a coin refund button and refund chute for accepting correctly-sized coins of at least two different sizes and rejecting wrongly-sized coins, and for separately routing the accepted coins of different sizes,

(b) coin-accumulating means to collect the accepted coins in at least a first column of coins of one size stacked edge-on-edge and a second column of coins of a second size similarly stacked, said coin accumulating means incorporating hinged coin deflector flaps to support the first and second coin columns,

(c) at least two mechanical coin-detecting means including pairs of arms with coin sensing fingers each movable to

detect the presence of the top one of the requisite number of coins accumulated in each of the columns of the coin-accumulating means,

(d) packet delivery means for delivering a packet comprising packet vending drawers to be pulled out by the customer, said packet delivery means manually operable when unlocked to vend a packet, and

(e) locking sears for the packet delivery means which is coupled to said coin sensing fingers to lock the packet delivery means and prevent a packet being vended if the coin-detecting means fails to detect the requisite number of coins in its respective coin-accumulating means,

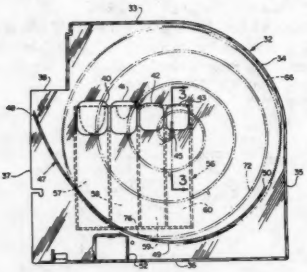
where the accepted coins pass under coin energy through the coin measuring apparatus and into the coin accumulating means, and subsequently into coin boxes or a refund cup, and the coin-detecting means are operated by the manual effort of the customer each time a customer attempts to hand-operate the packet delivery means whereby when a drawer is pulled out the deflector flaps swing one way to allow the coins to fall from the accumulating means and to direct them into the coin boxes, and if a drawer is not pulled but the refund button is operated the deflector flaps swing another way to allow the coins to fall into a refund chute returning them to the customer.

4,987,990

COIN BANK

Jerzy Perkitny, Cleveland, Ohio, assignor to Mag-Nif, Inc., Mentor, Ohio

Filed Jul. 25, 1989, Ser. No. 384,760
Int. Cl.[5] G07D *3/02*
U.S. Cl. 194—242 **39 Claims**



1. A coin bank comprising an upright first plate, an opposed second plate parallel to said first plate and journalled for rotation with respect to said first plate, a ridge projecting from said second plate toward said first plate, a radially extending sizing restriction projecting from said ridge, an elevated coin hole in said first plate, means to drop a coin into said bank to roll to the bottom of said opposed plates, and means to rotate said second plate with respect to said first plate to elevate the coin while rolling on said ridge until caught by the sizing restriction to be then elevated through an arc to drop through said hole.

4,987,991

SYSTEM FOR CHANGING THE SPEED OF CONVEYED SHEETS WHILE HOLDING REGISTER

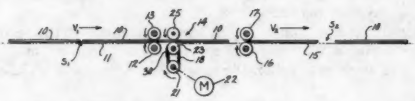
Carl R. Marschke, Phillips, Wis., assignor to Marquip Inc., Phillips, Wis.

Filed Mar. 30, 1990, Ser. No. 502,175
Int. Cl.[5] B65G *47/31*
U.S. Cl. 198—461 **14 Claims**

1. A system for changing the speed and spacing of discreet sheets of material being conveyed, in register on a first conveyor operating at a first speed, said system comprising:

a speed changing belt operating at a constant linear speed, said belt operating around a pulley positioned to present a cylindrical portion operating at an initial peripheral speed equal to said first speed in tangent contact with the sheets;

flexible holding means aligned with the tangent contact surface of said cylindrical portion and positioned to form therewith a nip for receiving sheets from said first conveyor; and,



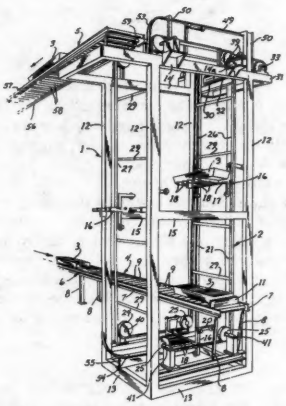
a speed change lobe on said belt defining a region of continuously changing radius as said belt operates around said pulley, whereby the outer surface of the belt including said lobe at the tangent contact surface operates at a continuously changing speed from said first speed to a second speed.

4,987,992

MATERIAL TRANSFER APPARATUS

Robert H. Pfleger, Milwaukee, Wis., assignor to Pflow Industries Inc., Milwaukee, Wis.

Filed Jan. 9, 1989, Ser. No. 294,349
Int. Cl.[5] B65G *47/53*
U.S. Cl. 198—475.1 **8 Claims**



1. A material transfer apparatus, comprising a supporting structure, a pair of flexible drive members mounted to move in parallel paths of travel, at least one carrier having a supporting surface to support an article to be transferred, means for journaling opposed ends of the carrier on said drive members for free rotation about a horizontal axis, said supporting surface being cantilevered outwardly from said axis, operating means for driving the drive members and corresponding moving said carrier in a path of movement including a generally upward run and a generally downward run, guide means on the supporting structure and disposed to be engaged by the carrier as the carrier moves in its path of movement, said guide means being constructed and arranged to maintain the supporting surface in a generally horizontal attitude as said carrier moves in said path of movement, feeding means for feeding an article onto said supporting surface as said carrier moves in the upward run, discharge means for discharging the article from the supporting surface as the carrier moves in the downward run, said discharge means comprising a pair of discharge conveyors disposed at different vertical levels, said discharge conveyor comprising a main conveyor section and a second conveyor section pivotally connected to said main section, each second

conveyor section being movable from a first position where it is disposed in the path of travel of said carrier as the carrier moves in said downward run to a second position where said second conveyor section is out of said path of travel, and means for selectively moving each second conveyor section from the first to the second position.

4,987,993

CONVEYOR BELT SCRAPER

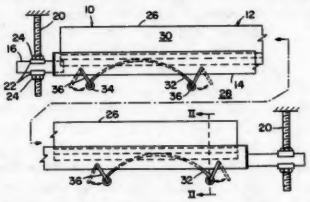
Hans-Otto Dohmeier, Johannesburg, South Africa, assignor to Karl-Heniz Erdmann, Bedfordview, South Africa, a part interest

Filed Feb. 5, 1990, Ser. No. 475,018

Claims priority, application South Africa, Feb. 8, 1989, 89/0966

Int. Cl.[5] B65G *45/00*

U.S. Cl. 198—499 **18 Claims**



1. A belt scraper comprising an elongate frame defining an elongate aperture; at least one scraper blade member guided for movement within and transversely to the aperture so that it can move towards and away from a belt to be cleaned; mounting means provided towards each end of the frame for mounting the frame with respect to a belt to be cleaned; spring support means connected to the frame; at least one elongate, accurate leaf spring supported on the spring support means, and the leaf spring and spring support means being arranged, in use, to bear against an edge of the scraper blade member to bias the scraper blade member outwardly of the aperture and towards the belt being cleaned.

4,987,994

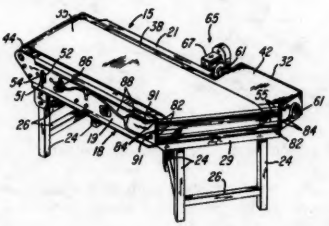
SPUR CONVEYOR ASSEMBLY

Richard W. Kelsey, West Chester, Ohio, assignor to Pre-Engineered Components, Inc., Cincinnati, Ohio

Filed Jun. 12, 1989, Ser. No. 364,145

Int. Cl.[5] B65G *15/60*

U.S. Cl. 198—811 **12 Claims**



1. A spur conveyor assembly for transporting packages and other articles and adapted to extend at an angle from a main package transporting conveyor, said assembly comprising a frame, an endless flexible belt of rubber-like material and having upper and lower runs, a set of belt guide rollers supported by said frame for rotation and positioned for directing said belt along a predetermined path, means mounted on said frame for supporting said upper run of said belt and the articles carried by said belt, means for driving one of said rollers to move said belt along said supporting means, a set of vertically spaced and non-rotatable elongated air distributing members extending within said belt, means for supplying pressurized air to each of said air distributing members, each of said air distributing members having opposite end portions and a curved outer surface with a longitudinally extending recess, means for securing said opposite end portions of said air distributing members to said frame for positively positioning said members at an acute angle relative to said belt path for changing the direction of travel of said belt, said belt extending around said air distributing members and horizontally between said members, and means for directing the air between each said air distributing member and said belt and longitudinally within said recess to produce a film of air between each said member and said belt to provide for axial and peripheral movement of said belt relative to each said member to permit high speed operation of said spur conveyor assembly without overheating said belt.

4,987,995

CROSS STACKING BOTTLE CASE

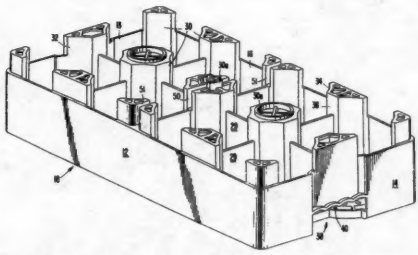
William P. Apps, Anaheim; James B. Rehrig, Rancho Palos Verde, both of Calif., and John A. Hagan, Ames, Iowa, assignors to Rehrig-Pacific Company, Los Angeles, Calif.

Division of Ser. No. 186,140, Apr. 26, 1988, Pat. No. 4,899,874.

This application Aug. 1, 1989, Ser. No. 387,798

Int. Cl.[5] B65D *25/08*

U.S. Cl. 206—201 **22 Claims**



17. A stackable case for retaining and transporting bottles comprising:

a plurality of outer side walls forming an outer shell;

a case bottom disposed substantially within the outer shell;

a plurality of means for supporting outer surfaces of bottles generally disposed within said outer shell and defining, in combination with the outer shell and the case bottom, a plurality of bottle retaining pockets with at least one bottle supporting means per pocket; and

a projecting portion, generally disposed within the shell and extending both above a top surface of one of said side walls and above a topmost point of at least some of said plurality of bottle supporting means, whose sole function is to cause the case to wobble when it is placed upside down on a flat surface.

4,987,996

FLEXIBLE DUCT AND CARTON

Charles B. Anderson, Jacksonville, Tex., assignor to Atco Rubber Products, Inc., Fort Worth, Tex.

Filed Mar. 15, 1990, Ser. No. 493,939

Int. Cl.[5] B65D *85/14*

U.S. Cl. 206—321 **4 Claims**

1. In combination, flexible duct and a carton for retaining and controllably dispensing said flexible duct therefrom, said carton comprising:

four connected side walls and two end walls;

said side walls comprising a first set of two walls parallel and opposite each other and a second set of two walls parallel

and opposite each other and normal to said walls of said first set;

said end walls each being joined to said side walls thereby said side walls and said end walls enclose said carton;

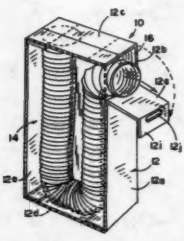
said second set of walls each having a width about equal to the diameter of said flexible duct;

one of said side walls having a breakout panel to form an outlet area, defined by a pair of perforated lines;

said panel extending from the juncture of said one side wall with one of said end walls to a boundary in said one side wall spaced from said juncture an amount at least equal to the diameter of said duct, and said panel extending from the juncture of said one side wall with an adjacent side wall to the juncture of said one side wall and with the other adjacent side wall, said junctures with said one side wall and said adjacent side wall having said perforated lines;

said juncture of said one side wall with said one end wall comprising a folded flap of said one side wall tucked into said one end wall;

said duct being compressed in said carton, with at least one end thereof at said one end wall adjacent said panel, whereby with breakout of said panel to form an outlet by untucking said flap and causing breakage along said pair of perforated lines and bending at said boundary, said one end of said duct can be flexed 90° to be oriented toward said outlet while resiliently biased against said one end wall so that said duct is retained by said bias against premature passage through said outlet, but is capable of controlled passage therethrough by pulling on said one duct end.



2. In combination, flexible duct and a carton for retaining and controllably dispensing said flexible duct therefrom, said carton comprising:

four connected side walls and two end walls;

said side walls comprising a first set of two walls parallel and opposite each other and a second set of two walls parallel and opposite each other and normal to said walls of said first set;

said end walls each being joined to said side walls thereby said side walls and said end walls enclose said carton;

said end walls being formed of folded side wall flaps;

said second set of walls each having a width about equal to the diameter of said flexible duct;

one of said side walls of said second set having a breakout panel to form an outlet area, defined by perforated lines;

said panel extending from the juncture of said one side wall with one of said end walls to a boundary in said one side wall spaced from said juncture an amount at least equal to the diameter of said duct, and said panel extending from the juncture of said one side wall with an adjacent side wall to the juncture of said one side wall and with the other adjacent side wall and joined to one of said side wall flaps, said junctures with said one side wall and said adjacent side wall including a pair of parallel perforated lines;

said one side wall flap having finger gripping means for enabling fingers to grip said one side wall flap and pull said flap and said panel for breakout of said panel along said perforated lines;

said duct being compressed in said carton, with at least one end thereof at said one end wall adjacent said panel, whereby with breakout of said panel to form an outlet, said one end of said duct can be flexed 90° to be oriented toward said outlet while resiliently biased against said one end wall so that said duct is retained by said bias against premature passage through said outlet, but is capable of controlled passage therethrough by pulling on said one duct end.

4,987,997

PACKAGING BAG

Lewis R. Raszewski, Stevensville, Md., and Jerome J. Kipnees, Cranbury, N.J., assignors to The Crowell Corporation, Newport, Del.

Continuation-in-part of Ser. No. 80,623, Jul. 31, 1987, abandoned, and a continuation-in-part of Ser. No. 54,024, May 22, 1987, and a continuation-in-part of Ser. No. 931,215, Nov. 14, 1986, abandoned, said Ser. No. 54,024, is a continuation-in-part of Ser. No. 938,600, Dec. 5, 1986, abandoned. This application May 31, 1988, Ser. No. 200,671

Int. Cl.[5] B65D *27/18*

U.S. Cl. 206—328 **13 Claims**

1. A bag for cushioning and protecting articles sensitive to mechanical damage as well as to electric fields, the walls of the bag being essentially a layer of cushiony microfoam about 1 to about 4 millimeters thick, an essentially unfoamed polyethylene coating about 25 to about 100 microns thick on the inside surface of the microfoam, an essentially unfoamed support layer on the opposite surface of the microfoam, at least one face of the support layer being treated to protect the bag contents against external electric fields, and the polyethylene coating carrying sufficient antistat to protect the bag contents against the build-up of static electricity to the intensity that damages those contents when they are slid into the bag.

4,987,998

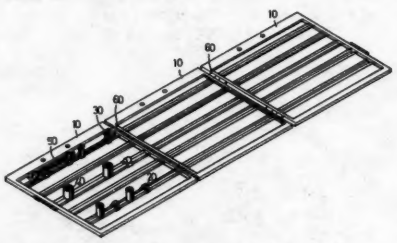
RETENTION DEVICE FOR COLLECTING SOCKETS AND WRENCHES

Chiung C. Tsai, No. 331, Ren Shin Rd., Wu Lin Tsuen, Ren Wu Shiang, Kaohsiung Hsien, Taiwan

Filed May 22, 1990, Ser. No. 526,980

Int. Cl.[5] B65D *85/20;* A47G *29/00*

U.S. Cl. 206—372 **2 Claims**



1. A retention device for collecting sockets and wrenches comprising:

a frame plate having a substantially rectangular opening and a plurality of receiving strips spaced in parallel on said frame plate and over said opening, each receiving strip comprising of a substantially U-shaped web and a pair of integral wing portions extending sideways from said web;

a plurality of first clips having a curved head and a pair of curved wings extending sideways from said curved head, said curved wings engaged with said wing portions, said curved head possessing resiliency and being shaped and sized to be able to receive a socket; and

a plurality of second clips being substantially C-shaped to define an opening, said second clips being fixedly attached on said curved head of a selected number of said first clips

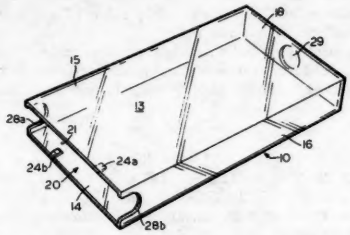
with the opening facing upward and in a direction away from said first clips, said second clips possessing resiliency and being shaped and sized to be able to receive a wrench.

4,987,999

VIDEOCASSETTE STORAGE AND DISPLAY SLEEVE

Bruce A. Hehn, Massillon, Ohio, assignor to Alpha Enterprises, Inc., East Canton, Ohio

Filed Jan. 22, 1990, Ser. No. 468,086
Int. Cl.[5] B65D *85/672*
U.S. Cl. 206—387 **10 Claims**



1. A sleeve for storing and displaying a videocassette comprising a pair of spaced parallel front and rear walls, and a pair of spaced parallel sidewalls forming a generally rectangular-shaped storage chamber, with said walls being formed of plastic material with at least the front wall being transparent: said sleeve having first and second ends, with the first end being formed with a generally rectangular-shaped opening through which a videocassette can be slidably inserted into and removed from said storage chamber, and the second end being formed with stop means for generally retaining the videocassette within said storage chamber and aperture means formed contiguous with said stop means in said second end; a hollow flexible cover having printed indicia thereon identifying a prerecorded program on the videocassette disposed within said storage chamber of the sleeve and conforming to the interior of said sleeve walls defining said chamber and configured to slidably receive the videocassette therein; and internal lug means formed integrally with certain of the walls adjacent to said first end opening for engaging a front end of the cassette and the flexible cover to maintain said cassette and cover within the storage chamber, with said aperture means allowing penetration of said stop means with finger pressure to remove the videocassette from said storage chamber past the lug means, with said lug means maintaining the flexible cover behind in the storage chamber.

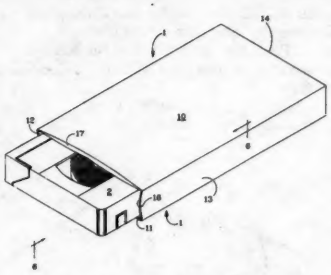
4,988,000

VIDEOCASSETTE STORAGE AND DISPLAY SLEEVE

James T. Weisburn, Massillon, and Gale W. Essick, East Canton, both of Ohio, assignors to Alpha Enterprises, Inc., East Canton, Ohio

Filed Feb. 5, 1990, Ser. No. 474,944
Int. Cl.[5] B65D *85/672*
U.S. Cl. 206—387 **12 Claims**

1. A sleeve for storing and displaying a cassette including, a pair of spaced parallel front and rear walls, and a pair of spaced parallel sidewalls forming a generally rectangular-shaped storage chamber, with said walls being formed of a flexible plastic material and at least the front wall being transparent; said sleeve having first and second ends, with the first end being formed with a generally rectangular-shaped opening through which a cassette can be slidably inserted into and removed from the storage chamber, and the second end being formed with stop means for generally retaining the cassette within said storage chamber; and flange means formed integrally with the front and rear walls adjacent to the first end opening and extending partially across said opening for blocking the opening to retain the cassette in the storage chamber when the flange means is in a nondeformed first position by engaging a front edge of the cassette, with said flange means being nondestructively deformable between the first position and a deformed second position upon manually squeezing inwardly externally on the sidewalls adjacent to the first end opening, to remove the flange means from blocking said end opening enabling the cassette to be removed from the storage chamber.

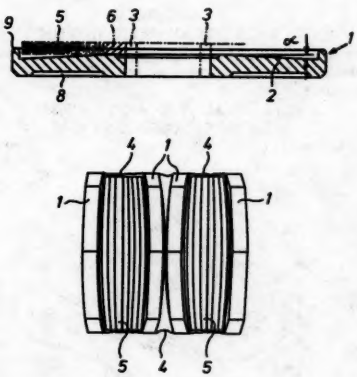


4,988,001

MULTI-UNIT PACKAGE FOR MAGNETIC TAPES WOUND ON TO CORES

Hermann Brandstetter; José Toral, and August Liepold, all of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 10, 1990, Ser. No. 462,789
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1989, 8900709[U]
Int. Cl.[5] B65D *85/67*
U.S. Cl. 206—394 **4 Claims**



1. A packing device for containing a plurality of pancakes consisting of tape windings of magnetic tape wound on flangeless winding cores having inner bores comprising:

a pallet for engaging pancakes in a package and having a central bore and a sloping inner surface, said surface being engageable with magnetic tape windings and being tapered in the region of engagement with a preselected slope at a cone angle relative to a reference plane diametric of the central bore,

said pallet being engageable by a shrink film wrapping,

said cone angle being provided so that when said shrink film wrapping engages said pallet, the inner surface rests against the magnet tape winding with substantially uniform pressure over an area of the tape.

4,988,002

CONTAINER FOR RECEIVING STACKS OF STAPLED SHEETS

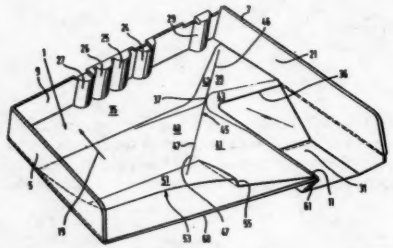
Ulrich Fischer, Kirchheim-Teck; Frank Goeltenboth, Ulm; Hans-Juergen Kurze, Remseck, and Heinz Wagner, Wiesensteig, all of Fed. Rep. of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 16, 1990, Ser. No. 509,458

Claims priority, application Fed. Rep. of Germany, May 17, 1989, 3916038

Int. Cl.[5] B65D *85/62*

U.S. Cl. 206—449 21 Claims



1. Container for receiving stacks of sheets which are connected in one corner by staples (33), said container comprising:

a support surface (1) including a recess (31) defined at a side edge of said support surface (1) for the stapled corners of stacks (13) of sheets received on said support surface (1), said support surface (1) being uneven relative to an imaginary reference plane (3) and having an elevation rising above said reference plane (3) provided adjacent to the edge (36, 43) of said recess (31).

4,988,003

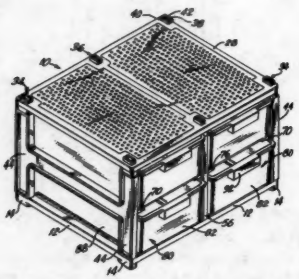
STACKABLE TRAY CARRYING UNITS

Charles M. Spitzer, Roslyn Heights, N.Y., and Paul F. Siegel, Ridgefield, Conn., assignors to A-Bee Syndicate, Inc., New York, N.Y.

Filed Feb. 14, 1990, Ser. No. 479,836

Int. Cl.[5] B65D *21/02*

U.S. Cl. 206—511 21 Claims



1. A stackable set of tray carrying units having at least an upper unit and a lower unit, each of said units comprising:

a floor member having four downwardly extending corner feet; and

a ceiling member having four downwardly extending corner feet and four upwardly extending corner split posts; and

four vertical corner beams, each of said corner beams having upper and lower extensions;

each of said lower extensions including a blade portion;

each corner foot of said floor member having a vertical through-opening sized to receive one of said lower extensions of one of said corner beams;

each of said corner feet of said ceiling member being in the form of an inverted hollow cup having an open end, the cup of each of said corner feet being sized to receive one of said upper extensions of one of said corner beams;

each of said split posts having first and second portions spaced from one another a predetermined distance to define a space therebetween, said predetermined distance between said spaced-apart first and second portions of said posts being less than the thickness of said blade portion of said lower extensions;

each of said split posts being sized to fit within one of said corner feet of a floor member of one of said units assembled on top thereof; and

said blade portion of said lower extension of a beam in an upper one of said units having an interference fit relation with the space defined by the split post of a lower one of said units.

4,988,004

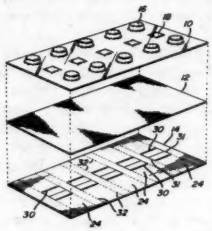
BEND 'N PEEL CHILD RESISTANT/TAMPER EVIDENT BLISTER PACKAGE

Thomas D. Intini, 9720 Recollet Street, Brossard, Quebec J4X 1B9, Canada

Continuation of Ser. No. 327,427, Mar. 24, 1989, abandoned, which is a continuation of Ser. No. 87,761, Aug. 21, 1987, abandoned. This application Mar. 12, 1990, Ser. No. 492,344

Int. Cl.[5] B65D *27/08*

U.S. Cl. 206—532 3 Claims



1. A child-resistant tamper evident package such as medicaments in the form of capsules, tablets or the like, the package comprising an outer front blister layer having a plurality of article receiving pockets formed therein, a rupturable foil being sealed to planar portions of the back of the blister layer to thereby form a continuous uninterrupted cover over said pockets, said foil being of a thickness and material which can be ruptured to provide access to the pockets, and a reinforcing back layer formed of a paper board material, a major portion of said back layer being adhered to said foil layer and a minor portion being non-adhered thereto, said paperboard back layer being adapted to separate into strata, a plurality of tear strips formed in said reinforcing back layer, each tear strip being associated with one of said article receiving pockets, a tab member formed at one end of each of said tear strips, said tear strips being defined by a plurality of spaced apart cuts formed in said reinforcing back layer, said tab members forming said minor portion of said reinforcing back layer which is not adhered to said foil layer.

4,988,005

SIFTER

John T. Graham, P.O. Box 30004, Seattle, Wash. 98103-4004

Filed Feb. 26, 1990, Ser. No. 484,253

Int. Cl.[5] B07B *1/02*

U.S. Cl. 209—419 1 Claim

1. A hand-held sifter tool for picking up, shaking and thereby sifting various types of aggregate matter ranging in

size from coarse to fine, the tool comprising a generally "Y" shaped frame constructed substantially from a single straight piece of material formed by cutting the piece for a certain distance to provide two cut sides and a remaining uncut portion, bending each cut side and inserting a wedge block to reinforce the junction of the two cut sides with the remaining

uncut portion, a blade fixed to and spanning between the end of each side of said "Y" shaped frame to form a contained area, an essentially triangular shaped perforated planar sifting screen, said perforated planar sifting screen being substantially supported on two sides thereof by the said "Y" shaped frame and on the third side by said blade, and said remaining uncut portion forming a handle integral to said "Y" shaped frame.

4,988,006

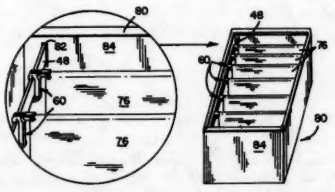
FLEXIBLE POCKET DIVIDER AND SUPPORT ASSEMBLY

David J. Lundin, Cedar Park, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 23, 1989, Ser. No. 328,018

Int. Cl.[5] A47F *7/16*

U.S. Cl. 211—46 **17 Claims**



1. An article for attaching the end of an elongated member to a rail having top and bottom surfaces, comprising:

means for receiving the elongated member, said receiving means having a flat exterior surface for contact with the top surface of the rail; and

means for opposing rotational movement of said receiving means about the rail, wherein said means for opposing rotational movement comprises:

a boss member attached to said receiving means for contact with the rail, said boss member being generally perpendicular to said flat surface;

a beam member having first and second ends, said first end being attached to said receiving means with the beam member being generally perpendicular to said flat surface; and

a flange means for abutting the bottom surface of the rail, said flange means being attached to said second end of said beam member.

4,988,007

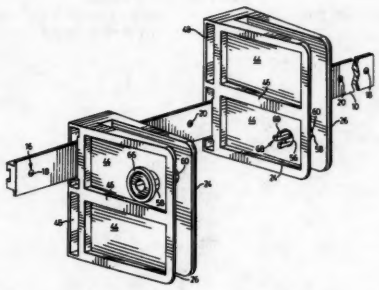
MODULAR SKI RACK AND MOUNTING KIT

John B. Chiarot, 32 Golf Valley Lane, Etobicoke, Ontario, Canada M9C 2K3

Filed Jun. 19, 1990, Ser. No. 540,176

Int. Cl.[5] A47F *7/00*

U.S. Cl. 211—70.5 **20 Claims**



1. A mounting kit for a modular ski rack system, comprising:

a bracket member having two oppositely projecting parallel marginal flanges, the bracket member adapted to be mounted on a vertical surface with said marginal flanges horizontally disposed and spaced from the surface;

means for mounting the bracket member on the surface;

at least one ski hanger module, each such module having:

an upright thickened back portion with a race defined therethrough for loosely engaging the marginal flanges for slidably mounting the ski hanger module on the bracket member; and

a pair of substantially parallel upright wall members forwardly projecting from the back portion and spaced apart by enough distance to permit insertion of a pair of typical skis arranged base-to-base at a portion adjacent their curved front ends, the wall members having a dimension parallel to the back portion which is great enough to ensure that the pair of typical skis received therebetween will be maintained together by the wall members without slipping down through them; and

disengageable abutment means for retaining the pair of typical skis in the module against forward lateral sliding.

4,988,008

SUPPORTING FRAMEWORK FOR A CONTROL CABINET

Richard Blum, Dietzenbach; Hans-Michael Groh, Hainburg; Willi Küster, Gelnhausen, and Ludwig Schmidt, Frankfurt, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 18, 1990, Ser. No. 539,720

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1989, 3920353

Int. Cl.[5] A47F *5/00*

U.S. Cl. 211—189 **15 Claims**

1. A supporting framework for a control cabinet, comprising:

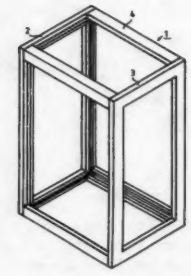
(a) frame elements of a first type for use as side frame pieces, said side frame pieces forming side frames of the control cabinet, said frame elements of the first type having a generally rectangular cross-sectional form comprising longer inner and outer lateral sides and shorter front and back sides, and an opening in the inner, longer side defined by two shanks;

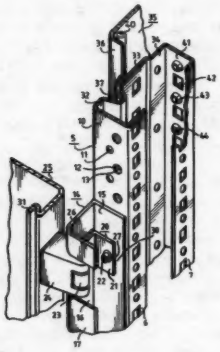
said side frame elements of the first type further having at least two flat surface sections provided on the longer outer lateral side opposite said opening, said flat surfaces lying on parallel, spaced apart planes separated

from each other by at least one indentation, said at least two flat sections being disposed one behind the other, one of the flat sections being contiguous with one of the front and back sides;

(b) frame elements of a second type for forming cross-beams of the control cabinet, said frame elements of the second type connecting said side frames to each other, said frame elements having a generally square cross-sectional form beveled on one corner and comprising:

a first pair of orthogonal sections of equal length as wide as the longer lateral sides of the side frame elements;





a second pair of shorter sections, each shorter section being adjacent and orthogonal to one of the first pair of orthogonal sections;

shanks contiguous with the shorter sections set at an angle of approximately 45° with respect thereto, and which define an opening therebetween; and

(c) tracks of holes within at least one of said first and second type of frame elements for mounting covering panels, doors, and built-in units.

4,988,009

TELESCOPIC BOOM MOBILE CRANES

John Atkinson, Riding Mill, England, assignor to Grove Coles Limited, England

Filed May 10, 1989, Ser. No. 349,613

Claims priority, application United Kingdom, May 12, 1988, 8811230

Int. Cl.[5] B66C *23/26*

U.S. Cl. 212—182 **8 Claims**

1. A telescopic boom mobile crane, comprising:

a vehicle;

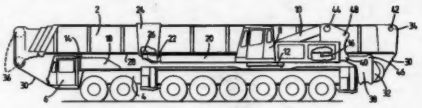
a turntable, rotably mounted to said vehicle;

a telescopic boom having a base;

a releasable means for pivotally coupling the base of the telescopic boom to said turntable when in a raising configuration and for releasing the base of the telescopic boom from the turntable when in a lateral movement configuration;

rollers mounted to the vehicle at positions so the telescopic boom may be moved longitudinally relative to the vehicle when the pivotally coupling means is in the lateral movement configuration;

a dual function main hydraulic ram including a piston and a cylinder, one of the piston and cylinder mounted to the vehicle; and



a means for securing the other of the piston and cylinder to a plurality of positions along the telescopic boom to permit the hydraulic ram to move the telescopic boom along the rollers when the pivotal coupling means is in the lateral movement configuration and to permit the hydraulic ram to raise the telescopic boom about the pivotally coupling means when the pivotally coupling means is in the raising configuration.

4,988,010

COMPARTMENTALIZED TRASH CONTAINER

Thomas F. Pollak, Ossining, N.Y., assignor to Bruce L. Adams, Roseland, N.J., a part interest

Filed Aug. 10, 1989, Ser. No. 392,203

Int. Cl.[5] B65D *91/00*

U.S. Cl. 220—503 **17 Claims**

1. A compartmentalized trash container comprising: a container having bottom and side walls; means dividing the interior of the container into a plurality of separate compartments including at least one upper compartment and at least one lower compartment, each compartment being dimensioned to receive and store therein a preselected kind of trash; and means for individually accessing each of the compartments independently of the others to enable trash to be transferred into and out the compartments, the means for individually accessing the compartments including at least one slidable drawer slidably mounted on slideways in one upper compartment, and at least one pivotable door pivotably mounted on the container adjacent one lower compartment.

4,988,011

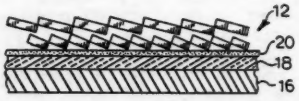
EXPLOSION RESISTANT FUEL CONTAINER APPARATUS

Ronald L. Fenton, Wood Dale, Ill., and Robert Brandt, New York, N.Y., assignors to Safetytech Corporation, Mount Prospect, Ill.

Continuation-in-part of Ser. No. 391,237, Aug. 9, 1989, abandoned. This application Jan. 3, 1990, Ser. No. 460,401

Int. Cl.[5] B65D *25/16*

U.S. Cl. 220—88.1 **8 Claims**



1. An explosion resistant container for inflammable fluids comprising:

an outer shell forming a primary wall of the container;

an inner shell affixed within said outer shell to provide a secondary wall of the container;

wherein the temperature at which said inner shell begins to

lose its structural integrity is higher than the corresponding temperature of said outer shell; and

a filler insert formed to substantially conform to the shape of the container and adhered to said inner shell.

4,988,012

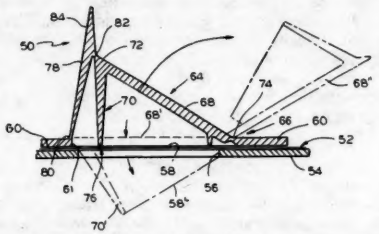
TAMPER EVIDENT DISPENSING CLOSURE

E. D. Shastal, 1149 SE. Coral Reef St., Port St. Lucie, Fla. 34983

Division of Ser. No. 217,477, Jul. 11, 1988, Pat. No. 4,892,217. This application Jul. 27, 1989, Ser. No. 385,697

Int. Cl.[5] B65D *51/22*

U.S. Cl. 220—258 **15 Claims**



1. A closure for selectively closing an opening of a container which includes a tamper-evident seal extending across the opening, said closure comprising:

a base element having means for affixation thereof to a container adjacent an opening in the container so that a seal extending across the container opening is disposed between said base element and the container; and

a control element having a connecting portion pivotally connecting a stopper portion to said base element at a pivot connection, said stopper portion being adapted to overlay the container opening in a first position, a puncturing portion including means for puncturing a tamper-evident seal on a container if said stopper portion is pivotally moved about said pivot connection to a second position, and a gripper portion adapted to be engaged by a user to pivot the stopper portion about said pivot connection to withdraw the stopper portion from the container opening in a third position.

4,988,013

CONTAINER LID STRUCTURE AND METHOD FOR MANUFACTURING THE SAME

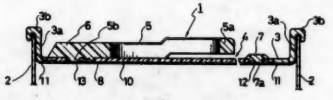
Yukio Kobayashi; Hitoshi Sasaki, and Shoji Igota, all of Kawasaki, Japan, assignors to Ajinomoto Company, Inc., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,559

Claims priority, application Japan, Dec. 22, 1987, 62-322889; Oct. 13, 1988, 63-258323

Int. Cl.[5] B65D *17/40*

U.S. Cl. 220—276 **12 Claims**



1. A container lid structure comprising:

a lid frame adapted to be attached to an end of a container barrel, said lid frame having an inner peripheral portion;

a lid plate comprising an inner layer attached to the lid frame and an outer core arranged with respect to said lid frame such that an outer peripheral portion of said outer core is in abutting relationship with the inner peripheral portion of said lid frame, said lid frame and said lid plate being formed of materials which are substantially non-bonding with respect to one another; and

a tab having a portion mounted to said outer core of said lid plate and a pull portion, said tab being mounted to said lid plate on an outer side thereof such that an edge of said tab presses down the lid plate to deform the outer peripheral portion of said lid plate toward said interior side when said pull portion is pulled,

wherein said abutting relationship defines a weakened portion which breaks to permit the outer peripheral portion of the lid plate to separate from the inner peripheral portion of the lid frame and deform toward said interior side to piece said inner layer and form an opening in the lid structure in response to said pull portion being pulled.

4,988,014

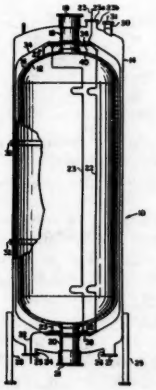
METHOD AND APPARATUS FOR STORING CRYOGENIC FLUIDS

Alexander P. Varghese, Bethlehem, and Robert H. Herring, New Tripoli, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 152,278, Feb. 4, 1989. This application Aug. 3, 1989, Ser. No. 389,705

Int. Cl.[5] F17C *7/02*

U.S. Cl. 220—469 **12 Claims**



1. In a dewar for storing or transporting cryogenic fluid of the type containing an outer vessel and an inner vessel disposed therein, said inner vessel including means to admit and withdraw cryogenic fluid from the interior therefore, and insulation between said inner and outer vessels, the improvement comprising:

disposing at least one metallic transient heat shield between said inner and outer vessels, said heat shield containing means to retain refrigeration, said means to retain refrigeration adapted to be contacted by cryogenic fluid as it is withdrawn from said inner vessel said means to retain refrigeration also includes at least one thermal sink in heat exchange with said cryogenic fluid withdrawal means.

4,988,015

METHOD FOR DISPENSING FLUID MATERIALS

Richard P. Price, Parma Heights, Ohio, assignor to Nordson Corporation, Westlake, Ohio

Division of Ser. No. 243,238, Sep. 7, 1988, Pat. No. 4,922,852, which is a continuation of Ser. No. 924,920, Oct. 23, 1986, abandoned. This application Mar. 8, 1990, Ser. No. 490,827

Int. Cl.[5] G01F *1/34*

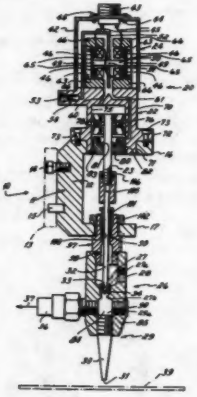
U.S. Cl. 222—1 **6 Claims**

1. A method of dispensing fluid material, said method comprising the steps of:

(a) delivering the fluid under pressure to a valve having a valve inlet and a valve outlet and conducting the fluid from said valve to a nozzle having a nozzle inlet and a

nozzle outlet from which said fluid is dispensed, said valve outlet being coupled to said nozzle inlet, said valve outlet and said nozzle inlet being disposed in sufficiently close proximity to one another that very little fluid pressure drop occurs between said valve outlet and said nozzle inlet;

(b) sensing, at a location between said valve outlet and said nozzle inlet a parameter other than the position of a flow restricting element, said parameter being correlated to the



rate of flow of the fluid discharged from said nozzle outlet and generating a corresponding flow rate signal;

(c) generating a control signal from at least said flow rate signal, and

(d) operating said valve in accordance with said control signal to substantially infinitely variably modulate the flow of fluid dispensed from said nozzle outlet when said valve is at least partially open and to positively cut off flow when said valve is closed.

4,988,016

SELF-SEALING CONTAINER

James P. Hawkins, 6848 Draper, LaJolla, Calif. 92037, and Hassan Aref, Solana Beach, Calif., assignors to James P. Hawkins, LaJolla, Calif.

Filed Jan. 30, 1989, Ser. No. 303,891

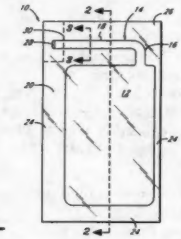
Int. Cl.[5] B65D *37/00*

U.S. Cl. 222—92 **1 Claim**

1. A container for fluids, comprising:

a reservoir formed by said container for holding a fluid; and

an exit flow channel joined to said reservoir at an inlet orifice formed by a deformable material for expelling said fluid from said reservoir when a pressure is applied to said container, said exit flow channel (i) permitting the flow of fluid when said applied pressure is above a predetermined level, and (ii) preventing the flow of fluid when said applied pressure is below said predetermined level, said exit flow channel having a width (W), wherein



$$W = \frac{\sigma \sin\alpha}{kR}$$

wherein:

σ = the surface tension for the fluid

α = the wetting angle of the fluid on the material in question

k = the elasticity constant for said material

R = the sealing parameter corresponding to the critical pressure differential below which the channel accomplishes self-sealing divided by k

and said exit flow channel having a length (L), wherein

$$L = \frac{q_{ave}\, kW^4}{\eta\, Q_{ave}}$$

wherein:

q_{ave} = the flow rate parameter corresponding to an applied pressure differential divided by k, wherein said applied pressure differential equals the difference between outside, ambient pressure and the pressure at said inlet orifice

k = the elasticity constant for said material

W = the width of said exit flow channel

η = the viscosity of said fluid

Q_{ave} = the flow rate of said fluid in response to said applied pressure differential.

4,988,017

DUAL CHAMBER AEROSOL CONTAINER

Dieter Schrader, Duesseldorf; Karl Giede, Hilden; Hans Schneider, Schwalmtal, and Diethelf Mehl, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 822,954, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 369,548, Apr. 19, 1982, abandoned, and a continuation-in-part of Ser. No. 623,680, Jun. 22, 1984, abandoned. This application May 8, 1986, Ser. No. 861,038

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1981, 3116282; Jun. 27, 1983, 3323070

Int. Cl.[5] B65D *83/14*

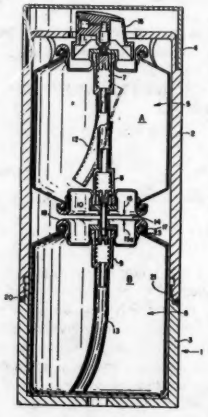
U.S. Cl. 222—130 **11 Claims**

6. An aerosol container system with two separate chambers each of which contains a component to be mixed with the other component just prior to use, which consists essentially of:

(a) a container;

(b) an upper chamber and a lower chamber housed in spaced relationship a coupling distance from each other within said container;

(c) an opening in said upper chamber at its top with a first head valve assembly sealingly seated therein, and an opening at its bottom with a bottom valve assembly sealingly seated therein;



(d) an opening in said lower chamber at its top surrounded by a collar which is an integrally formed rolled edge of the

top opening in said lower chamber, and a top valve assembly positioned in said opening;

(e) conduit means flowingly connecting said bottom valve assembly and said top valve assembly, permitting these valves to operate synchronously when said upper chamber and said lower chamber are moved toward each other;

(f) flexible bag nonadheringly lining the inside of said lower chamber and having an opening at its top; said flexible bag being of material resistant to hydrogen peroxide solution; and

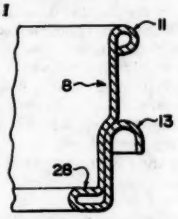
(g) a sealing ring integrally formed from the bag material and located around the periphery of said bag opening, said sealing ring being several times thicker than the wall thickness of said bag and sealingly positioned within the space between said collar and said top valve assembly.

4,988,018

AEROSOL ADAPTER CLAMP

Terrence Loychuk, North Vancouver, Canada, assignor to Nozone Dispenser Systems, Inc., Canada

Filed May 19, 1989, Ser. No. 355,198
Claims priority, application Canada, Dec. 2, 1988, 584776
Int. Cl.[5] B67D *5/06*
U.S. Cl. 222—183 **7 Claims**



1. A hollow adapter of generally cylindrical shape suitable for enabling a nozzle to be fitted to the top of an aerosol can comprising:

(a) rounded ridge means formed around the top of the adapter, said ridge means being adapted to mate with a rim of an aerosol nozzle;

(b) lip means formed on the exterior surface of the adapter at a location below the ridge means, said lip means being shaped to form between it and the wall of the adapter a receptacle adapted to mate with a rim surrounding the opening in the top of an aerosol can; and

(c) base means at the base of the adapter extending to a hollow interior of the adapter, said base means having an opening therein, and being adapted to receive in bearing support thereon the upper open region of an open-ended bladder adapted to contain and power through the nozzle a liquid contained in the bladder.

4,988,019

COMPACT PORTABLE DISPENSING SYSTEM FOR EDIBLES SUCH AS TEA

Charles R. Dawes, 4885 Gray St., Denver, Colo. 80212

Filed Jul. 31, 1989, Ser. No. 386,728
Int. Cl.[5] B67D *5/58*
U.S. Cl. 222—189 **8 Claims**

1. A compact, portable, disposable dispensing system for edibles capable of providing air tight packaging comprising;

(a) a lid member;

(b) a packing enclosure defining a cavity wherein said packaging enclosure is capable of mechanical interfit in an air tight manner with said lid member;

(c) a straining container capable of close mechanical interfit within the cavity formed in said packaging enclosure wherein the geometry of said straining container corresponds to the geometric shape defined by the interior structural portion of said packing enclosure that defines said cavity therein, and additionally defining therein its own cavity, said straining container being sized so as not to prevent the mechanical interfit between said packing enclosure and said lid member, said straining container further having formed within the bottom portion of its structure openings capable of allowing for the flow of liquid therethrough;

(d) a tab member in the form of a disk member capable of being passed a desired distance into the cavity formed within said straining container;

(e) a liquid permeable bag member containing therein an edible substance, said bag member capable of being contained within the cavity formed within said straining container; and

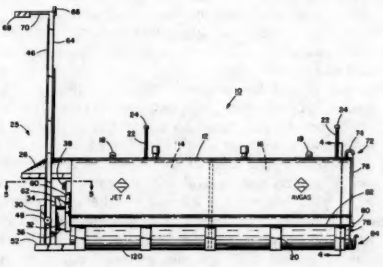
(f) a string member having one end thereof structurally affixed to said bag member and the other end thereof mechanically affixed to said tab member, wherein during the use thereof the user can place said bag member into said straining container, said bag member being compressible against the bottom of said straining container by said tab member so as to allow a flow of liquid therethrough, thus enhancing the extraction of said edible substance.

4,988,020

PORTABLE FUELING FACILITY

R. Michael Webb, Eau Claire, Wis., assignor to U-Fuel, Inc., Eau Claire, Wis.

Filed Mar. 30, 1989, Ser. No. 332,462
Int. Cl.[5] B67D *5/64, 1/16*
U.S. Cl. 222—608 **15 Claims**



1. An improved non self-propelled portable fueling facility comprising:

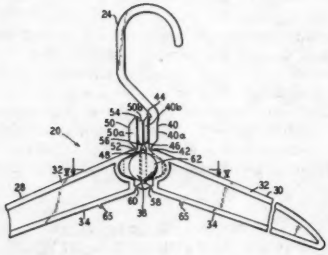
storage tank means for storing fuel;
outer tank means for providing secondary containment about said storage tank means;
means for supporting said outer tank means on an underlying surface wherein said means for supporting includes a fixed lower surface for engaging the underlying surface;
pump means adapted for dispensing fuel into an aircraft or the like;
supply pipe means for guiding fuel from said storage tank means to said pump means; and
deck compartment means for supporting said pump means with respect to the underlying surface, said deck compartment means being connected to said outer tank means, and having a compartment defined therein through which said supply pipe means extends, whereby the area around said supply pipe means is protected from incidental spillage which could result in contamination or combustion.

4,988,021

COLLAPSIBLE CLOTHES HANGER

Michael E. Adams, 2009 Walters Ave., Northbrook, Ill. 60062, and John Fitch, Cary, Ill., assignors to Michael E. Adams, Northbrook, Ill.

Filed Aug. 28, 1989, Ser. No. 399,766
Int. Cl.[5] A47G *25/14, 25/40, 25/28, 25/36*
U.S. Cl. 223—94 **16 Claims**



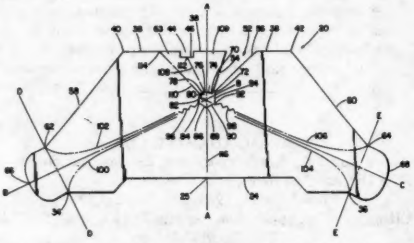
3. A collapsible clothes hanger comprising;
a hook means for suspension of the hanger;
first and second arms each of an elongated shape having first and second opposite ends, said first ends of said first and second arms each having two spaced support locations, said second ends being free ends;
a central support member between said first ends of said first and second arms;
first and second hinges connecting first ones of said two spaced support location to said central support member;
first and second link members connected by further hinges between second ones of said two spaced support locations of corresponding ones of said first and second arms on one hand and said central support member on the other hand, said first and second link members being bendable;
fastening means for fastening said first and second arms in an extended position, said fastening means being releasable to permit said first and second arms to move to a collapsed position by pivoting about said first and second hinges; and
said hook member extending from said first link member.

4,988,022

GARMENT HANGER SHOULDER GUARD AND BLANK THEREFOR

Joel Seitz, S. Hackensack, N.J., assignor to Chesapeake Fiber Packaging Corporation, Hunt Valley, Md.

Filed May 5, 1988, Ser. No. 190,584
Int. Cl.[5] A47G *25/20*
U.S. Cl. 223—98 **13 Claims**



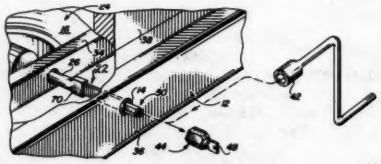
1. A card stock blank, which may be folded to become a garment hanger shoulder guard without the need for a slot and tab type closure, comprising a foldable material having a base edge and top edge parallel to one another, two side edges, a first fold line substantially perpendicular to and extending from the base edge along a transverse line to a central hole, a second fold line on one side of the transverse line and extending between the top edge and the central hole and making a predetermined angle with the top edge, the top edge interrupted by a notch in communication with the central hole and defined in part by a first edge extending between the top edge and the central hole, the notch being further defined by a second edge confronting the first edge and between the second fold line and the first edge, the side edges being on opposite sides of the transverse line and symmetrically disposed with respect to the central hole, the blank being foldable along the first fold line and along the second fold line into a flat condition with the first edge coinciding with the second fold line and with material of the blank adjacent to the first edge confronting and overlapping material of the blank located between the second fold line and the second straight edge.

4,988,023

MODIFIED SPARE TIRE CARRIER SECURITY DEVICE

Ellis W. Heathcoat, P.O. Box 14566, Odessa, Tex. 79768

Filed Mar. 21, 1989, Ser. No. 326,713
Int. Cl.[5] B62D *43/04*
U.S. Cl. 224—42.210 **18 Claims**



1. In a vehicle having a rear bumper and a spare tire carrier, a rotatable shaft, a retracting mechanism actuated by said rotatable shaft which extends towards the rear bumper, wherein rotation of the shaft actuates the retracting mechanism and lifts and extends a wheel mounted spare tire respective to the spare tire carrier; the shaft can be engaged by a crank which can be attached thereto and rotated to actuate the retracting mechanism and thereby retract and extend the spare tire respective to the spare tire carrier, the combination with the retracting mechanism of a drive device by which the shaft can be rotated:

said drive device has opposed marginal ends, drive means on one of said opposed ends of said drive device and attachment means on the other of said oppossed ends of said drive device; said drive device is affixed to the shaft by said attachment means;

said drive means has an inner drive member which is adapted to be engaged by a crank and thereby enable said drive device member to be rotated; a cover removably received about said inner drive member, lock means by which said cover and said inner drive member are rotatably fastened together with said cover rotatably receiving said inner drive member therein to thereby place said drive device in a locked configuration;

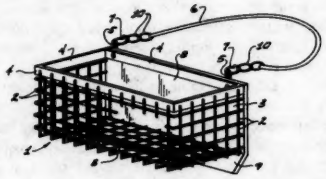
whereby; said cover can be removed from said drive device and thereby place said drive device in an unlocked configuration, whereupon said inner drive member can be engaged by a crank and rotated, thereby rotating the shaft of the retracting mechanism and lifting and/or extending the spare tire respective to the spare tire carrier.

4,988,024

METAL COLLECTION VESSEL

Robert D. Weber, 554 Huth Rd., Cheektowaga, N.Y. 14225

Filed Mar. 29, 1990, Ser. No. 500,898
Int. Cl.[5] A45F *5/00*
U.S. Cl. 224—226 **6 Claims**



1. A collection vessel having a rectangular configuration comprising in combination a mesh basket, a solid back panel, a deflection panel and retaining means, said mesh basket comprising a plurality of wires that intersect to form a plurality of openings, said mesh basket having a mesh structure on at least one side and its bottom portion to permit sand or other materials to fall therethrough, said mesh basket comprising a substantially solid back panel on a side to be worn against the user's body, and extending downwardly from and beyond a bottom portion of said basket is a substantially planar deflector panel which is angled away from said user's body to deflect materials falling through said bottom portion away from the user's body, said mesh basket having around substantially a mesh portion of its upper peripheral portion a crush guard which maintains and strengthens the rectangular configuration of said vessel.

4,988,025

SHOPPING CART ATTACHMENT

Jack B. Lipton; Pamela A. Hall, both of New York, and Mario J. Morbelli, Jr., Rego Park, all of N.Y., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

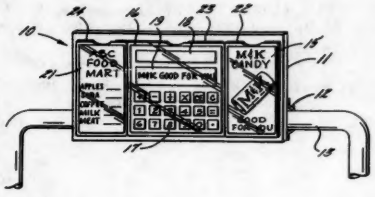
Filed Dec. 14, 1989, Ser. No. 450,887
Int. Cl.[5] B60R *7/00*
U.S. Cl. 224—277 **12 Claims**

1. A shopping cart attachment comprising:

a substrate; and

means for attaching said substrate to a shopping cart;

said substrate including an advertisement and a calculator, said calculator comprising an electrically interconnected microprocessor, keyboard and display, said calculator being adapted to display a message related to said advertisement on said display, in response to a predetermined occurrence.

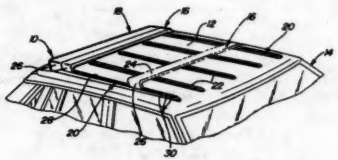


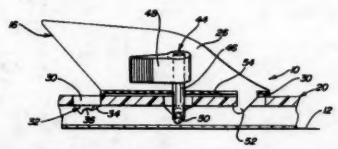
4,988,026

DISCRETELY ADJUSTABLE SUPPORT RAIL FOR LUGGAGE CARRIERS

William Rasor, Goodells, and Craig A. Stapleton, Port Huron, both of Mich., assignors to Huron/St. Clair Incorporated, Port Huron, Mich.

Filed May 15, 1989, Ser. No. 351,986
Int. Cl.[5] B60R *9/00*
U.S. Cl. 224—321 **13 Claims**





1. An article carrier mountable to a surface of a vehicle, said carrier comprising:

a pair of side rails mounted to the vehicle surface, said side rails having an upper mounting surface, said upper surface including a plurality of spaced apart apertures extending substantially the length of said side rails and defining a plurality of discrete mounting positions;

at least one movable cross rail mounted to said side rails, said at least one cross rail discretely adjustable along said side rails such that said at least one cross rail may be located in one of said discrete mounting positions along said side rails; and

means for releasably locking said at least one cross rail in one of said discrete positions along said side rails, said locking means including a cam handle connected to a cam shaft, said cam shaft extending into one of said apertures of said mounting surface defining said one discrete position, said cam shaft rotatable into locking engagement with said side rail upon pivotable movement of said cam handle.

4,988,027

APPARATUS FOR CUTTING GLASS

Alan M. Bremner, Murrumbeena, Australia, assignor to Bremner Glass Equipment Pty. Ltd., Murrumbeena, Australia

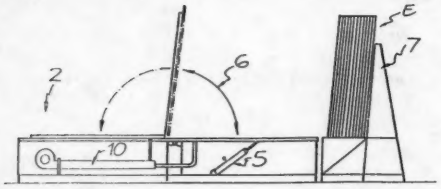
PCT No. PCT/AU88/00173, § 371 Date Jan. 10, 1989, § 102(e) Date Jan. 10, 1989, PCT Pub. No. WO88/09775, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 3, 1988, Ser. No. 299,836

Claims priority, application Australia, Jun. 5, 1987, PI2320

Int. Cl.[5] C03B *33/03*

U.S. Cl. 225—2 10 Claims



1. Method of cutting laminated glass comprising:

(i) delivering glass to a two-part table on which the glass is to be cut;

(ii) cutting the uppermost sheet of the glass;

(iii) flipping the glass over from one side to the other so that the lowermost sheet of the glass is presented for cutting in the same or a similar manner to the uppermost sheet; and

(iv) thus cutting the lowermost sheet of the glass;

wherein said flipping action is being performed by moving a first part of the table to an upright position with respect to a second part, thereby facilitating delivery of the glass to the second part in an inverted state.

4,988,028

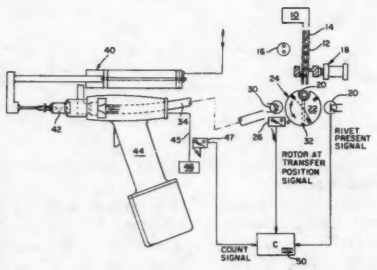
AUTOMATIC RIVETING MACHINE

Charles F. Smart; Raymond H. Varian, both of Danbury, and Anthony D'Aquila, Trumbull, all of Conn., assignors to Emhart, Inc., Towson, Md.

Filed Dec. 1, 1989, Ser. No. 445,076

Int. Cl.[5] B21J *15/10*

U.S. Cl. 227—3 3 Claims



1. A rivet setting machine comprising

a rivet tool for setting rivets,

means for counting the number of rivets set by said rivet tool,

means for supplying rivets to said rivet tool including

a rivet track for supporting parallel rivets in single file,

feeder means for feeding rivets to said rivet track,

gating means for releasing rivets from said rivet track, one at a time, and

means for determining that said feeder track is empty,

means for actuating said feeder means either when a selected number of rivets has been counted by said counting means or when said counter has counted a lesser number of rivets but said determining means determines that said rivet is empty.

4,988,029

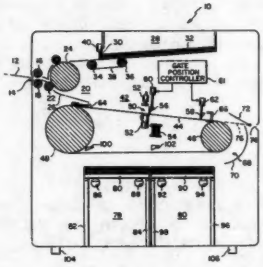
FINISHER ACCESSORY FOR HARD COPY PRINTERS

John M. Fiske, Medford, Mass., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,103

Int. Cl.[5] B27F *7/19*

U.S. Cl. 227—5 27 Claims



1. A finisher accessory suitable for use with hard copy printers which produce printed sheets having first and second predetermined widths, said accessory being operable to fasten together a plurality of similar sized sheets to form a fastened sheet set, said accessory comprising:

a fastening station operable to fasten the sheet sets together with a fastening member;

means for transporting sheets into the fastening station;

a first controllable gate positioned along the transport means to locate the edges of sheets having the first predetermined width at the fastening station;

a second controllable gate positioned along the transport means to locate the centers of sheets having the second predetermined width at the fastening station;

means for removing fastened sheet sets from the fastening station; and

means for controlling the position of the first and second gates depending upon the width of the sheets being fastened.

4,988,030

PRINTED RECORDING PAPER PROCESSING APPARATUS

Takeshi Muramatu, Sayama; Masaaki Sekiguchi, Asaka, and Tsugio Hirabayashi, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,498

Claims priority, application Japan, Apr. 7, 1988, 63-87589

Int. Cl.[5] B42B *2/00*

U.S. Cl. 227—27 4 Claims

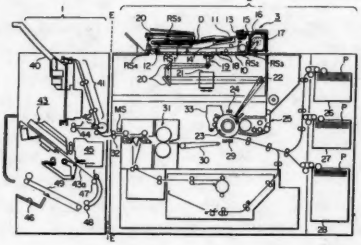
1. An apparatus for punching holes in a plurality of recording sheets for use in an image recording machine, the apparatus comprising:

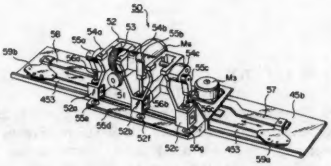
a first sheet receiving means for stacking said recording sheets at a predetermined place;

a first conveyance means for conveying the recording sheets to said first sheet receiving means;

a sheet processing means for hole punching and binding the recording sheets stacked in said first sheet receiving means, said sheet processing means including means for

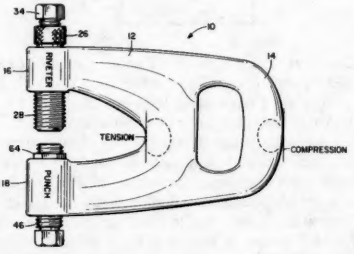
selectively providing hole punching only, binding only, and both hole punching and binding;
a second sheet receiving means; and





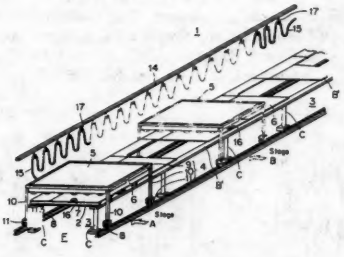
a second conveyance means for conveying said sheets from said sheet processing means to said second sheet receiving means.

4,988,031
HAND TOOL FOR INSTALLING AND REMOVING RIVETS
David J. Jordan, 2505 W. Iola, Broken Arrow, Okla. 74012
Filed Jan. 5, 1990, Ser. No. 461,330
Int. Cl.[5] B25C *11/00*
U.S. Cl. 227—63 **7 Claims**



1. A hand tool for both installing and removing mallable rivets, comprising:
a generally C-shaped body including generally parallel first and second portions;
a clamp sleeve extending through a bore in the first end portion;
a rivet forming member extending coaxially through a longitudinal bore in the clamp sleeve;
a punch member extendable through a bore in the second end portion, the bore in the first end portion and the bore in the second end portion being coaxially aligned;
the clamp sleeve adapted to press a workpiece against a punch guide portion of the second end portion;
the rivet forming screw adapted to form a rivet from a rivet end extending outwardly from the workpiece while a head portion of the rivet is received into the punch guide portion; and
the punch member adapted to extend through the punch guide portion to engage a head portion of the rivet and remove the rivet from the workpiece.

4,988,032
METHOD FOR ASSEMBLING A STRUCTURAL PANEL IN ORDER TO PREVENT THE SAG THEREOF
Akira Sakaguchi; Hisashi Uchibe, and Toshiyuki Tange, all of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan
Continuation-in-part of Ser. No. 246,933, Sep. 19, 1988, abandoned, Division of Ser. No. 930,185, Nov. 13, 1986, abandoned. This application Mar. 26, 1990, Ser. No. 498,771
Claims priority, application Japan, Nov. 29, 1985, 60-269858
Int. Cl.[5] B23K *9/225, 9/235*
U.S. Cl. 228—102 **7 Claims**



1. A method for preventing sag due to welding within a structural panel of substantially flat construction and comprising a skeleton framework and a thin plate which is to be secured to said skeleton framework, comprising the steps of:
providing a support surface;
laterally spacing a pair of vertically upstanding support means upon said support surface;
placing said skeleton framework upon upper end portions of said laterally spaced pair of vertically upstanding support means such that opposite sides of said skeleton framework are supported upon said upper end portions of said support means at an elevated level above said support surface so as to provide substantially unobstructed access to undersurface portions of said structural panel, formed by said skeleton framework and said plate after said plate has been placed upon said skeleton framework, as well as junction regions defined between under-surface portions of said plate and said skeleton framework after said plate has been placed upon said skeleton framework;
providing mobile radiation heating means which is movable between first and second positions;
moving said radiation heating means to said first position at which said radiation heating means, having downwardly projecting radiation heating elements, is disposed over said plate disposed upon said skeleton framework;
energizing said radiation heating means so as to heat said plate to a predetermined temperature level at which said plate achieves thermal expansion;
moving said radiation heating means to said second position remote from said thin plate when said thin plate has been heated to said predetermined temperature level and has achieved said thermal expansion so as to provide substantially unobstructed access to upper surface portions of said panel formed by said skeleton framework and said plate, as well as junction regions defined between upper surface portions of said plate and said skeleton framework, in order to facilitate securement of said plate to said skeleton framework within the vicinity of said upper and undersur-

face portions of said structural panel, as well as within said junction regions defined between said undersurface and upper surface portions of said plate and said skeleton framework;

welding said plate to said skeleton framework within said junction regions defined between said upper surface portions and said undersurface portions of said plate, and said skeleton framework, as permitted by said unobstructed access to said junction regions defined between said upper surface portions and said undersurface portions of said plate, and said skeleton framework, as well as said upper and undersurface portions of said panel formed by said plate and said skeleton framework; and

permitting said thin plate to cool so as to achieve thermal shrinkage deformation and the development of predetermined residual tensile stresses therewithin whereby the sag of said panel is effectively prevented.

4,988,033

REPAIR OF FLIGHT BARS

Friedhelm E. Hesse, Canonsburg, Pa., assignor to Advanced Longwall Equipment, Inc., Houston, Pa., assignee: Advanced Longwall Equipment, Inc., Houston, Pa.

Filed Jul. 28, 1989, Ser. No. 386,890

Int. Cl.[5] B23K *31/02*

U.S. Cl. 228—119 **11 Claims**

1. A method of repairing worn flight bars used in chain conveyors of the type having profiled sigma sections for guiding similarly profiled flight bar end portions therethrough, the repair method comprising:

a. cutting a worn end portion from each end of the flight bar to provide, in plan view, a non-planar surface configuration at each cut end, and at least one flat vertical surface in side view, said surface configuration being non-coincident with a plan coincident to a conveying direction of the flight bar;

b. providing a replacement endpiece for each end of the flight bar, said replacement endpiece having a profiled outer surface substantially matching a profile geometry of an original flight bar end and having an inner face profile matching the surface configuration of the cut flight bar ends;

c. positioning said cut flight bar and said profiled replacement endpieces in an aligned position wherein said inner faces of the profiled replacement endpieces are engaged by the respective cut ends of the flight bar; and

d. welding said profiled replacement endpieces to the flight bar.

4,988,034

MECHANICAL PART HAVING CERAMIC AND METAL SECTIONS SOLDERED TOGETHER AND METHOD OF PRODUCING SAME

Masato Taniguchi, and Harumi Suzuki, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Dec. 21, 1988, Ser. No. 287,158

Claims priority, application Japan, Dec. 25, 1987, 62-195667[U]

Int. Cl.[5] B23K *1/20, 103/16*

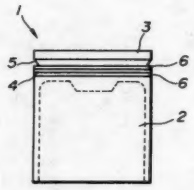
U.S. Cl. 228—122 **10 Claims**

1. A part comprising:

a metal section; and

a ceramic section having a joining surface at which it is soldered to said metal section;

said ceramic section having a chamferred edge at the periphery of said joining surface;



said joining surface and said chamferred edge being metallized prior to soldering of said joining surface to said metal section.

4,988,035

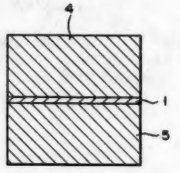
METHOD OF LIQUID PHASE DIFFUSION BONDING OF METAL BODIES

Yasuhiro Ueno; Hiroshi Kagechika; Itaru Watanabe; Shigeyoshi Kosuge, and Toshifumi Kojima, all of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 246,909, Sep. 16, 1988, abandoned, which is a continuation of Ser. No. 12,090, Feb. 9, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,789

Int. Cl.[5] B23K *20/02*

U.S. Cl. 228—175 **12 Claims**



1. A method of liquid phase diffusion bonding of two base metal bodies, each made of a metal or alloy material, using an insert, said method comprising the steps of:

forming bonding alloy layers having a melting point lower than that of the materials of said base metal bodies on both major surfaces of a thin substrate made of a material selected from the group consisting of Fe, Ni, Cu, Ti, a Fe-based alloy, a Ni-based alloy, a Cu-based alloy and a Ti-based alloy, differing in metal or alloy base from both of said materials of said base metal bodies by plating of said bonding alloy layers on said substrate to produce said insert, said bonding alloys being selected for respectively having atoms diffusible by heat into the respective materials of said first and second base metal bodies;

inserting said insert between said base metal bodies; and

heating said base metal bodies and said insert while held together to a temperature not lower than the melting point of said bonding alloy layers and lower than melting points of said materials of said base metal bodies and said substrate to diffuse the atoms of said substrate and said base metal bodies, thereby joining said base metal bodies, said substrate having a thickness not exceeding 500 μm and being sufficiently thick for material thereof to remain thereafter as a layer joining said base metal bodies.

4,988,036

VACUUM BRAZE CYCLE FOR CLAD ALUMINUM SHEET

Gary A. Kemble, Lockport; Melvin C. Nietopski, Cheektowaga, and Joseph P. DiFonzo, Lewiston, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 9, 1990, Ser. No. 506,128
Int. Cl.[5] B23K *103/10*
U.S. Cl. 228—217 2 Claims

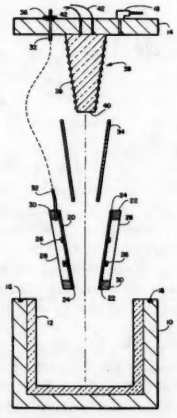
1. A method for manufacturing a braze bonded aluminum sheet structure comprising arranging clad aluminum sheet components in an assembly having a seam between the components, said aluminum sheet components including a braze cladding composed of hypoeutectic aluminum-silicon alloy containing magnesium, and carrying an oxide film on the surface thereof, and brazing the assembly by heating the cladding to melt the braze alloy and to cause the molten braze alloy to flow into the seam, said brazing further comprising initially heating the cladding to a first temperature to vaporize magnesium from the braze alloy, heating to a second, relatively higher temperature to melt a portion of the braze alloy without initiating significant alloy flow into the seam, maintaining the cladding at said second temperature for a time effective to vaporize residual magnesium from the braze alloy and to disrupt the surface oxide film by exudation, and thereafter heating the assembly to a third temperature sufficient to complete melting of the cladding and to effectuate flow of the molten alloy into the seam, whereafter the braze alloy cools and solidifies to form a braze bond between the components.

4,988,037

METHOD AND APPARATUS FOR SUPERPLASTIC FORMING AND DIFFUSION BONDING OF HOLLOW PARTS

Gilbert C. Cadwell, Lakeside, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Oct. 31, 1988, Ser. No. 264,817
Int. Cl.[5] B23K *20/00, 20/22, 19/00*
U.S. Cl. 228—265 6 Claims



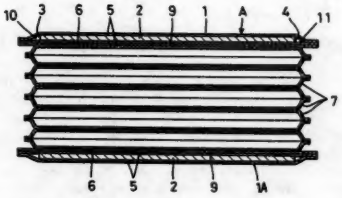
1. A method for superplastic forming and diffusion bonding of hollow metal parts which comprises the steps of:
preparing a pair of concentric metal parts which are surfaces of revolution;
placing selected discrete metal parts between said parts intermediate the axial ends thereof;
closing the spaces between the axial ends of said parts to produce a part assembly;
inserting a hollow tool into said part assembly, the exterior surface of said tool being in uniform contact with the interior surface of the inner concentric part;
placing said part assembly and tool in a pressure chamber;
placing a heater inside said hollow tool;
closing said chamber;
evacuating the interior of said part assembly;
activating said heater to heat said part assembly to the diffusion bonding temperature of the part metals;
pressurizing the interior of said chamber; and
whereby the outer concentric metal part is forced into contact with said discrete parts and said inner concentric part and all parts comprising the part assembly are diffusion bonded to form a unitary product.

4,988,038

DOCUMENT FILE

Masuhiro Mitsuyama, 1071, Kinugasa, Wake-cho, Wake-gun, Okayama, Japan

Filed Sep. 25, 1989, Ser. No. 412,321
Int. Cl.[5] B65D *3/00*
U.S. Cl. 229—1.5 R 6 Claims



1. A document file comprising:
a first cover formed of two sheets attached together at locations along bottom edges and both side edges thereof, and a first thick pad mounted therebetween said two sheets of said first cover, said first thick pad being laterally shorter than said two sheets of said first cover and being mounted between said two sheets of said first cover such that spaces are respectively formed between said first thick pad and each of said locations along which said side edges are attached together
an auxiliary sheet attached at both side edges thereof to both side edges, respectively, of one of said two sheets of said first cover in such a manner that said auxiliary sheet is normally disposed flat against said one of said tow sheets of said first cover; and
a plurality of upwardly opening compartments attached together in accordion-like fashion, a first end compartment of said plurality of upwardly opening compartments being attached to said auxiliary sheet.

4,988,039

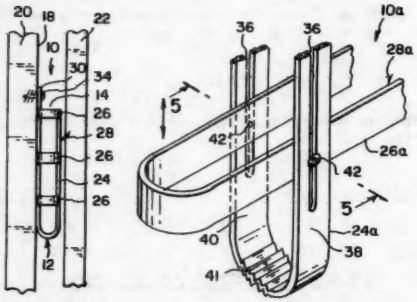
NEWSPAPER BASKET

Christopher A. Jentsch, 37 Choate Ave., Buffalo, N.Y. 14220, and George Spector, 233 Broadway #3815, New York, N.Y. 10007

Filed Aug. 10, 1989, Ser. No. 391,977
Int. Cl.[5] A47F *5/00*
U.S. Cl. 232—1 C 1 Claim

1. A newspaper holder which comprises:
a) a housing body having an open top for receiving a newspaper deposited therein; and
b) means for mounting said housing body to an exterior surface of an entry door so that said housing body will be between a screen/storm door and the entry door, wherein said housing body includes:
c) a plurality of spaced apart vertical U-shaped bands; and
d) a plurality of space apart horizontal oval-shaped bands interconnected to said vertical bands to form a basket so

that the newspaper can be seen when deposited therein, wherein said mounting means includes at least two of said vertical bands each having an extended rear leg with an aperture therethrough for receiving a fastener which extends into the exterior surface of the entry door, wherein said horizontal and vertical bands are integral with each other so that said basket is formed as a one piece unit, wherein said basket further includes:



e) each of said vertical bands having a longitudinal slot formed in front and rear legs and an accordion bottom portion; and

f) a plurality of set screws, each placed through one of said longitudinal slots and threaded into one of said horizontal bands so that said horizontal bands can slide up and down while said accordion bottom portions of said vertical bands can expand allowing said basket to be adjustable to accommodate various sized newspapers therein.

4,988,040

DEVICE FOR SECURING A RAIL TO A SLEEPER

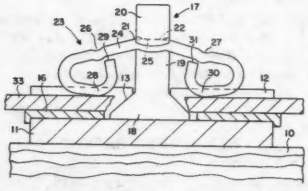
Siegfried Keusch, Plochingen, Fed. Rep. of Germany, assignor to Schwihag Gesellschaft fur Eisenbahnoberbau GmbH, Fed. Rep. of Germany

Filed Jun. 8, 1988, Ser. No. 254,943

Claims priority, application Fed. Re . of Germany, Oct. 8, 1986, 3634249; Mar. 19, 1987, 3709034

Int. Cl.[5] E01B *9/48*

U.S. Cl. 238—349 **27 Claims**



1. A device for securing a rail to a railroad tie, said device comprising a base plate having guide ribs for abutment against a rail foot, said base plate being securable to said tie, anchorage openings formed in said guide ribs, anchors positionable in respective ones of said anchorage openings, each said anchor having an abutment for clamping said rail foot to said base plate, the improvement comprising:

said abutment being an extension arm formed integrally with said anchor and projecting beyond and above said rail foot, said anchor disposed on both sides of said rail, a resilient clamping element disposed in the longitudinal direction of said rail into a channel formed between the rail foot and said extension arm, said clamping element having a concave locking cavity centrally positioned on an outer periphery thereof, said extension arm having a convex transverse locking web in a face thereof engaging said concave locking cavity of the clamping element, said locking cavity and said locking web extending at right angles to said rail, said clamping element being C-shaped bearing centrally upon said extension arm, said clamping element having a free end resting upon said rail foot, said clamping element being subjected to deformation and being supported under tension between said rail foot and said extension arm.

4,988,041

METHOD AND APPARATUS FOR WATERING CULTIVATED LAND, PROVIDING A PROTECTION FOR CULTIVATED PLANTS

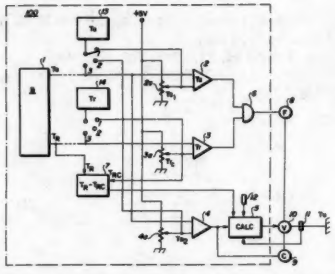
Jean L. Ducrot, Kechiloa, R.N. 10, 64122 Urrugne, and Ayme' de la Chevreliere, Gournay, F 79110, Chef-Boutonne, both of France

Filed Dec. 5, 1988, Ser. No. 280,169

Claims priority, application France, Dec. 9, 1987, 87 17145

Int. Cl.[5] A01G *13/00*

U.S. Cl. 239—2.1 **9 Claims**



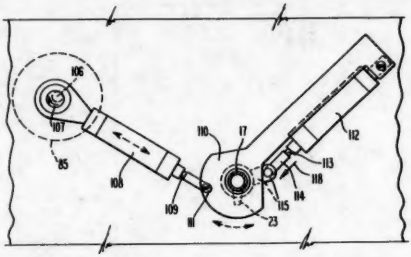
1. A method for watering agricultural crops and the like, in which use is made of spraying devices supplied with water through a piping system and producing a fine spray, distributed evenly over an area to be protected so as to irrigate the whole extent of the area, and in which measurements are made of ambient temperature and of dew point temperature, characterized in that the measured values of the ambient temperature and the dew point temperature are used for producing a first signal which is transmitted to a device initiating watering and a second signal which, upon the ambient temperature having dropped down to a predetermined temperature, will initiate a warming-up of the water and activate a regulation of the water temperature as a function of the deviation between the measured dew point temperature and a prescribed dew point temperature for raising and maintaining the dew point temperature above a predetermined value until the ambient temperature will have dropped below said prescribed dew point temperature, in which case the spraying and warming-up of the water will be maintained in order to obtain throughout the plantation and up to a determined height an atmosphere having a dew point temperature which ensures protection of the crops against the effects of an ambient temperature drop below a determined value, by creating and maintaining dew and rime.

4,988,042

AUTOMATED CAR WASH SYSTEM

Daniel J. Del Prato, Marlton, N.J.; and Sherman L. Larson, Palmyra, N.J., assignors to Sherman Industries, Inc., Palmyra, N.J.

Division of Ser. No. 84,180, Aug. 12, 1987, Pat. No. 4,946,513.
This application Jun. 26, 1989, Ser. No. 373,187
Int. Cl.[5] B08B *3/00*; B05B *3/12*
U.S. Cl. 239—263 10 Claims



4. A shifting mechanism for controlling the axial rotation of a bar, the bar having a plurality of nozzles for dispensing a fluid, the shifting mechanism comprising:

(a) a first movable member, capable of linear reciprocating movement,

(b) a second movable member, capable of linear reciprocating movement,

(c) means for connecting said first movable member to said second movable member, the connecting means being freely rotatable around the longitudinal axis of said bar,

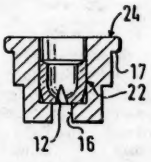
(d) the second movable member being connected to said bar, wherein linear movement of the second movable member causes axial rotation of said bar, and wherein linear movement of the first movable member causes rotation of the connecting means so as also to cause axial rotation of said bar.

4,988,043

NOZZLE FOR ATOMIZING LIQUID MEDIA, IN PARTICULAR A FAN-JET NOZZLE

Walter H. Lechler, Stuttgart, Fed. Rep. of Germany, assignor to 501 Lechler GmbH & Co. KG, Fellbach, Fed. Rep. of Germany

Filed Sep. 21, 1989, Ser. No. 410,418
Int. Cl.[5] B05B *1/04*
U.S. Cl. 239—597 7 Claims



1. A fan-jet nozzle for atomizing liquid media, comprising:

(a) a nozzle housing means forming an exterior shell having a first end for connection to a fluid supplying means,

(b) said nozzle housing means having an interior cylindrical cavity extending from said first end,

(c) said nozzle housing means having a second end,

(d) said second end having a slot formed therein extending from said second end to said cavity,

(e) said nozzle housing means having a rest surface formed where said slot meets said cavity,

(f) a nozzle inset means for atomizing a liquid media,

(g) said nozzle inset means is undetachably press-fitted within said cylindrical cavity,

(h) said nozzle inset means has formed therein a hollow chamber and having a liquid media receiving opening at one end and a smaller liquid media discharge opening at a second end,

(i) said discharge opening is positioned to expel atomized liquid media through said slot,

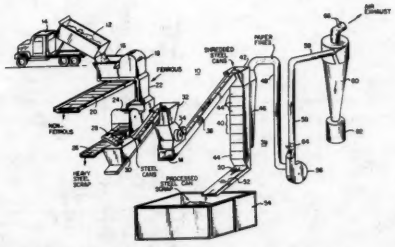
(j) said nozzle inset means having a flat end-face which engages said rest surface.

4,988,044

STEEL CAN SHREDDING/DELABELING SYSTEM AND METHOD

David H. Weitzman, and Jeffrey M. Young, both of Utica, N.Y., assignors to Resource Recycling Technologies, Inc., Binghamton, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,361
Int. Cl.[5] B02C *21/00*, *23/22*
U.S. Cl. 241—14 11 Claims



1. Steel can shredding and delabeling apparatus for post-consumer processing of steel cans into a scrap form suitable for detinning, comprising:

magnetic separation means for receiving incoming waste including steel cans and separating non-ferrous solid waste from said steel cans;

surge hopper means after said magnetic separation means having a hopper input to receive said steel cans and an outlet from which said cans are fed at a controlled, steady volume rate;

comminuting means having an outlet into which said cans are fed from the surge hopper means and an outlet, for shredding said steel cans into small particles of sheet steel that are not tightly folded or balled, to provide a can scrap mixture of metal particles and paper fines;

an air-classification aspirator which includes a column having an inlet at its top which receives the can scrap mixture from the outlet of the comminuting means and an outlet at its bottom, means creating an upwardly flowing air stream for separating the papers fines from the metal particles within said column, and exhaust air conduit means for conducting exhaust air and said paper fines entrained therewith from said aspirator column; and

receptacle means to receive the separated steel particles from the bottom outlet of said aspirator column.

4,988,045

VERTICAL SCRAP METAL CRUSHER

Henry C. Griesedieck, III, Manchester, and Sven B. Strom, St. Louis, both of Mo., assignors to American Pulverizer Company, St. Louis, Mo.

Filed Apr. 13, 1987, Ser. No. 37,733
Int. Cl.[5] B02C *25/00*
U.S. Cl. 241—36 8 Claims

1. A vertical scrap metal crusher comprising:

a tapered chamber having a tapering inner surface and a pair of ends;

said tapered chamber having a relatively large inlet at one of said ends and a relatively small outlet at the opposite said end of the chamber;

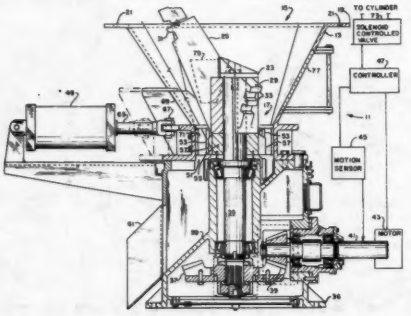
a rotary crusher arm axially mounted for rotation in the tapered chamber;

a rotor head axially disposed in the tapered chamber and carrying said crusher arm for rotation;

a plurality of vanes disposed along the inner surface of the tapered chamber and extending inwardly of the said chamber thereof, said rotary crusher arm and said vanes being cooperatively disposed to convey scrap inserted into the inlet of the tapered chamber towards the outlet of the chamber while simultaneously crushing said scrap;

a throat formed having a wall and disposed adjacent the outlet of the chamber for passage of crushed scrap therethrough, and a discharge chute in communication with said outlet;

means for automatically enlarging the throat upon jamming of the crusher to permit material causing the jamming to pass through the throat to the discharge chute;



the enlarging means including a door disposed in the wall of the throat and in a part of the tapered chamber adjacent the outlet end thereof, said door being movable along a lineal path radially outwardly upon the occurrence of jamming, the enlarging means further including a fluid-operated cylinder being one of a hydraulic and pneumatic type and operatively connected to the door for opening the door upon occurrence of jamming, the enlarging means including means for reversing the action of the fluid-operated cylinder to close the said door in movement upon its lineal path towards the tapered chamber and its communicating throat, said tapered chamber being arranged generally vertically;

whereby upon jamming of the crusher the said door comprising a part of the tapered chamber and its communicating throat moving radially lineally outwardly to allow passage of the jam inducing material to pass through the throat and to the discharge chute to alleviate the jamming condition.

4,988,046

PULVERIZER WITH AIR FILTERING MEANS

Siegfried Heilenz, Sportfeld 7, D-6300 Giessen-Kleinlinden, Fed. Rep. of Germany

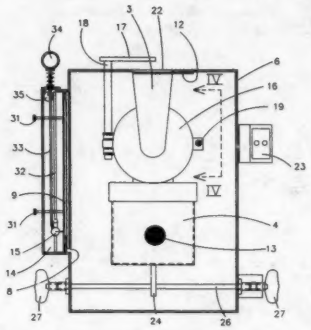
Filed Mar. 27, 1989, Ser. No. 328,867

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 8804036[U]

Int. Cl.[5] B02C *23/20*

U.S. Cl. 241—60 **12 Claims**

1. A pulverizer comprising a pulverizing device driven by means of a motor and connected to an inlet chute and a collecting reservoir for respectively supplying feed material to and receiving pulverized material from said pulverizing device, the improvement wherein the pulverizing device is arranged in a housing having at least one air-inlet opening and an air outlet, said housing otherwise defining a closed space around said pulverizing device, wherein the air outlet is arranged at the bottom side on the housing and is connected to a vacuum source for drawing air in a first direction from said housing through said air outlet, wherein a filter is provided in the area



of the air outlet for filtering pulverized material from the air as drawn through said air outlet, and wherein said pulverizing device includes an interior pulverizing means and removable cover means for selectively preventing and permitting access to said interior pulverizing means when said pulverizing device is operating and idle, respectively.

4,988,047

WINDING APPARATUS

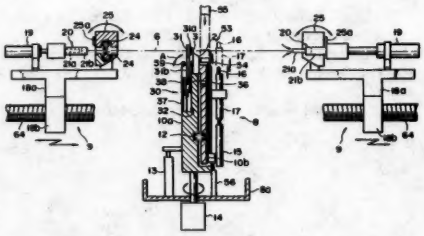
Kelichrou Kariya, and Masahiro Ishida, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 5, 1989, Ser. No. 333,587

Claims priority, application Japan, Apr. 11, 1988, 63-88575

Int. Cl.[5] H01K *41/08*

U.S. Cl. 242—4 R **19 Claims**



1. An apparatus for winding a wire piece having first and second end portions by at least one turn around at least one of a plurality of frame-like cores which are laterally formed on a workpiece with a small gap set therebetween and each of which has first and second end faces, the wire piece being inserted in the frame-like core, comprising:

a base having an operation surface;

workpiece holding means, mounted on said base so as to be rotatable about an axis perpendicular to said operation surface, for holding the workpiece with the frame-like core extending therefrom, the wire piece having the first end portion fixed to said means on the first end face side and the second end portion extending toward the second end face being inserted in the core held by said means;

first tension means, mounted on said operation surface so as to be movable in directions to move close and away from said workpiece holding means, for holding the second end portion of the wire piece and keeping the wire piece taut;

wire deflecting means which is fixed to said workpiece holding means on the second end face side of the core so as to be movable between an inoperative position at which said wire deflecting means is not brought into contact with the wire piece and an operative position at which the wire piece is deflected to one side, the operative position being defined such that contact of a portion of the wire piece between said workpiece holding means and said first tension means with the frame-like core is prevented when said workpiece holding means is rotated about the rotational axis thereof; and

guide means for guiding a wire piece portion between said first tension means and said wire deflecting means when said wire deflecting means returns to the inoperative position after said wire deflecting means is rotated together with said workpiece holding means to a position at which each face of the frame-like core is reversely located, said guide means having a guide plate which has a guide groove matching with the gap between the adjacent cores when said guide plate is in the operative position, the wire piece passing through said guide groove so as to be positioned in the gap between the adjacent cores.

4,988,048

METHOD AND DEVICE FOR WINDING CROSS-WOUND BOBBINS

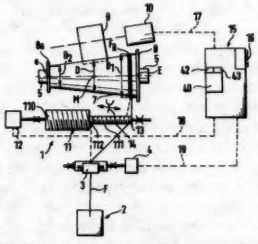
Hubert Lochbronner, Lenting, Fed. Rep. of Germany, assignor to Schubert & Salzer, Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

Filed Feb. 23, 1989, Ser. No. 315,050

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805656

Int. Cl.[5] B65H *54/42, 59/38*

U.S. Cl. 242—18 R **14 Claims**



1. A method for winding conical cross-wound bobbins, more particularly for open end spinning, in which the thread provided with a specific velocity by draw-off rollers is supplied to a bobbin or an empty casing, which is driven during the winding process by a drive device controlled by a control unit at an operating velocity adapted to the thread supply velocity, said method comprising:

determining an actual outer diameter of the bobbin or the empty casing; and

changing the drive velocity of the bobbin or empty casing relative to the operating velocity at least during a thread attachment phase as a function of the determined actual outer diameter of the bobbin or empty casing, such that the circumferential velocity of the bobbin or empty casing in the take-up region of the thread arranged axially at a distance from the longitudinal center of the bobbin or empty casing corresponds with the thread supply velocity, which circumferential velocity would otherwise deviate from the thread supply velocity on account of the conicity of the bobbin or empty casing.

8. A device for winding conical cross-wound bobbins, particularly for open-end spinning, including:

draw-off rollers for supplying thread with a specific velocity to a bobbin or an empty casing;

a drive device for driving the bobbin or empty casing during a winding process;

control means for controlling said drive device to operate at an operating velocity adapted to the thread supply velocity; and

means for determining the actual outer diameter of the bobbin or the empty casing;

wherein said control means functions to change the drive velocity of the bobbin or empty casing relative to the operating velocity at least during a thread attachment phase as a function of said determined actual outer diameter of the bobbin or empty casing, such that the circumferential velocity of the bobbin or empty casing in the take-up region of the thread arranged axially at a distance from the longitudinal center of the bobbin or empty casing corresponds with the thread supply velocity.

4,988,049

AIR CAPACITY CONTROLLING METHOD FOR CENTRALIZED BLOWER SYSTEM

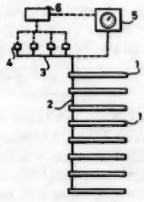
Yuji Konishi, Oumihachiman, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jun. 28, 1988, Ser. No. 212,525

Claims priority, application Japan, Jul. 8, 1987, 62-168586

Int. Cl.[5] B65H *54/20, 54/22*

U.S. Cl. 242—35.5 R **12 Claims**



4. An apparatus for controlling a blower system having air forcing means, controlled by a motor, for forcing air, at a pressure determined by the rotational speed of the motor, through a conduit to a plurality of winders, the apparatus comprising:

sensing means for sensing the pressure of the air in the conduit;

comparing means for comparing the sensed pressure to a reference pressure;

determining means for determining a pressure difference between the sensed pressure and the reference pressure; and

first adjusting means for adjusting the rotational speed of the motor from a first rotational speed to a second rotational speed when the pressure difference is greater than a predetermined value, wherein the first and second rotational speeds are greater than 0 rpm.

4,988,050

METHOD OF CONTROLLING YARN JOINING OPERATION

Shoichi Tone, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jul. 11, 1989, Ser. No. 378,326

Claims priority, application Japan, Jul. 15, 1988, 63-175065

Int. Cl.[5] B65H *54/22*

U.S. Cl. 242—35.6 O R **9 Claims**

1. In a winder for winding yarn from a supply bobbin along a yarn path and to a take-up package, the winder having a slub catcher adjacent the yarn path, the method comprising the steps of:

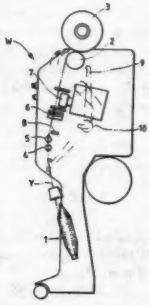
transfering yarn along the yarn path toward the take-up package;

providing a first signal with the slub catcher upon an end of

yarn extending from the take-up package passing the slub catcher;

changing the supply bobbin with a second supply bobbin in response to the first signal provided by the slub catcher;

detecting a slub in the yarn along the yarn path with the slub catcher and providing a yarn breakage signal upon the detection of the slub;



providing a second signal with the slub catcher upon an end of yarn extending from the supply bobbin passing the slub catcher; and

joining an end of yarn extending from the take-up package with an end of yarn extending from the supply bobbin in response to either of the second signal or the yarn breakage signal provided by the slub catcher.

4,988,051

METHOD OF WINDING CONTINUOUSLY SUPPLIED MATERIAL ON SEVERAL CORES AND DOUBLE BACKING-ROLLER WINDER

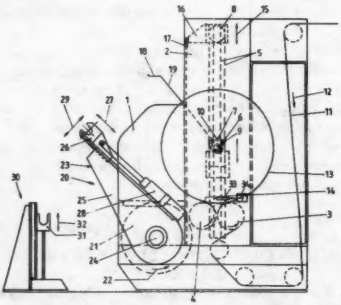
Udo Welschlau, and Uwe Melching, both of Northeim, Fed. Rep. of Germany, assignors to Thimm KG, Northeim, Fed. Rep. of Germany

Filed Jul. 5, 1988, Ser. No. 214,955

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723827

Int. Cl.[5] B65H *19/28*

U.S. Cl. 242—56 R **15 Claims**



1. A double backing-roller winder for winding continuously supplied material onto a plurality of core tubes, comprising: two powered backing rollers forming a bed for each of a plurality of reels; said reel having a core tube and material wound thereon; a tensioning roller extending vertically over the bed; means for supplying said core tubes to said bed; means for removing said reels from said bed; means for cutting off the material being wound; a Pope winder located downstream of said two backing rollers with a supporting roller and pivoting means; said supporting roller having a longer diameter than said backing rollers and having an axis; said pivoting means pivoting about said axis of said supporting roller; said pivoting means having two arms with sliding elements mounted thereon for accommodating a core tube; means for intercepting and removing finished reels, said pivoting means pivoting with said core tube and accommodating element either into a space above said backing rollers or beyond a winding position in said Pope winder as far as said means for intercepting and removing finished reels.

4,988,052

DEVICE FOR WINDING LONGITUDINALLY SEPARATED WEBS AND METHOD OF CHANGING FINISHED REELS AND EMPTY CORES

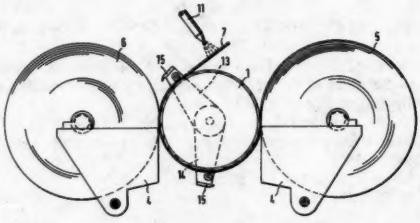
Ernst-Günther Urban, Buchenweg, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellshaft, Dusseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 586,939, Mar. 7, 1984, abandoned. This application May 7, 1986, Ser. No. 861,624

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1983, 3308271

Int. Cl.[5] B65H *19/26, 19/30*

U.S. Cl. 242—56.4 **6 Claims**



1. A device for winding longitudinally operated webs on reel cores comprising a backing roll, a plurality of reel cores disposed alternately on diametrically opposite sides of the backing roll with the number of cores being equal to the number of webs, means mounting each reel core for rotating about an independent axis of rotation comprising displaceable horizontal bearing brackets to force the core reels against one generating line on each side of the backing roll, means for removing the finished reels, means for separating the webs longitudinally and transversely to define a cut area, an automatic core inserter including conveyer means positioned under the backing roll for conveying the cores parallel to the longitudinal axis of the backing roll and means for stopping the cores under the bearing brackets, and means for applying glue to the vicinity of the cut area of the longitudinally separated web.

4,988,053

THERAPEUTIC WARMING BAG, AN APPARATUS FOR ITS MANUFACTURE, AND METHOD FOR MANUFACTURING A NEEDLE PUNCHED FABRIC OF THE BAG

Dong Sok Choi, Chungang Apt. Na-1206, Banghae-Dong, Socho-ku, Seoul, Rep. of Korea

Filed Jan. 9, 1989, Ser. No. 294,883

Claims priority, application Rep. of Korea, Jan. 12, 1988, 88-148; May 12, 1988, 88-6028

Int. Cl.[5] B65H *35/00*

U.S. Cl. 242—56.8 **4 Claims**

1. An apparatus for manufacturing a punched fabric for use in a therapeutic warming bag which comprises:

a supply coil for supplying a film coated fabric,

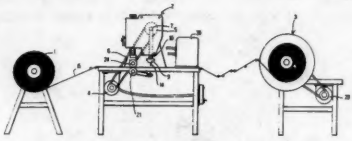
a punching body member for punching said film coated fabric to form a plurality of needle apertures disposed in the film coated fabric, said punching body member including:

a driving wheel driven by a motor,

a driving shaft extending to a shaft of said driving wheel, said driving shaft having a pair of first and second cranks,

a first connecting rod rotatably connected to said first crank at the one end, and connected to a needle punch at the other end thereof, said needle punch having a plurality of needles for forming said needle apertures,

a second connecting rod rotatably connected to said second crank at the one end, and adjustably connected to a clutch rod at the other end thereof through adjusting means for controlling the number of needle apertures in



the coated fabric, said clutch rod intermittently rotatably connected to a driving roller shaft through a ratchet and a stopper,

a driving roller having said driving roller shaft for advancing the punched fabric, and

a press roller having an operating switch for being operatively associated with said driving roller to effectively advance the punched fabric, and

a winding drum for winding the punched fabric, whereby the needle punch punches while the driving roller is stopped, the apparatus forms the needle apertures in the coated fabric as desired.

4,988,054

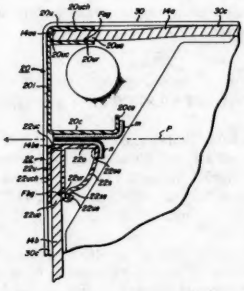
LIGHT-TIGHT CASSETTE

Mark J. Morse, and Andrew E. Dominesey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1989, Ser. No. 358,986

Int. Cl.[5] G03B *17/26*

U.S. Cl. 242—71.700 **16 Claims**



1. A light-tight cassette for enclosing and dispensing a roll of web material, said cassette comprising:

a housing including a plurality of housing wall portion shaving oppositely projecting side edges, said plurality including first and second substantially planar wall portions that extend continuously in respective first and second perpendicular planes to respective first and second wall portion ends that are disposed in spaced alignment with each other in said second plane to define an opening in said second plane between said wall portion ends;

first and second separately formed light-locking members attached to said first and second wall portion ends, respectively, one of said members extending across said opening in said second plane toward the other of said members to define a web exit passageway between said members, said one member including a cantilever portion that is resiliently flexible toward and away from an opposing portion of said other member, both of said cantilever portion and said opposing portion projecting inwardly from and substantially perpendicularly to said second plane, at least one of said cantilever portion and said opposing portion having light-locking material thereon, each of said light-locking members including a resiliently flexible U-shaped portion defining an open-ended channel configured to slidably receive and resiliently grip one of said wall portion ends, to thereby attach said first and second light-locking members to said first and second wall portion ends respectively, said one of said members extending across said opening in said second plane being said first light-locking member attached, via said U-shaped portion of said first member projecting substantially in said first plane, to said first wall portion end, said first member including a substantially planar intermediate portion that extends perpendicularly from said U-shaped portion of said first member, substantially in said second plane, to said cantilever portion of said first member, said cantilever portion being flexibly joined to said intermediate portion to project inwardly therefrom in a resiliently flexible manner; and

a pair of side caps having means for receiving, respectively, said oppositely projecting side edges of said plurality of housing wall portions and means for positioning said roll for relative rotation inside said housing.

4,988,055

COIL ASSEMBLY FOR POLYGONAL WIRE

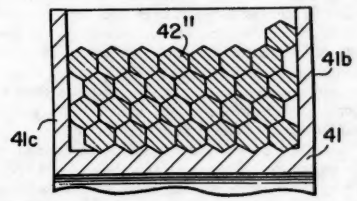
Masahiko Sakai, Takahama; Mithuyuki Hayashi, Nishio, and Toshihisa Taniguchi, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 11, 1989, Ser. No. 350,443

Claims priority, application Japan, May 25, 1988, 63-128047

Int. Cl.[5] B65H *55/00, 75/18*

U.S. Cl. 242—159 **6 Claims**



1. A coil assembly of the type which is equipped with a bobbin having a body on the outer peripheral coil winding surface of which a wire of polygonal cross-section is wound, and a first and a second flange which are provided at either end of this body and which are approximately perpendicular to the rotational axis of the body, comprising on the coil winding surface of said bobbin:

a plurality of first mutually parallel grooves, each of which has a section of V-notch shape which corresponds to an angular portion of said wire, which are parallel to said flanges and which are so arranged that the centers of adjacent grooves are separated from one another by a distance P which is the width of said grooves and which is substantially the same as the diagonal diameter of said wire; and

a plurality of second mutually parallel grooves corresponding to said first parallel grooves, each of which has a section of V-notch shape which corresponds to an angular portion of said wire, the ends of which do not meet with the ends of said first grooves and which are parallel to said flanges and are so arranged that the centers of adjacent

grooves are also separated from one another by the distance P;

each of the first grooves being off-set from the corresponding second groove in the axial direction by the distance of about P/2.

4,988,056

REEL MOTOR BRAKING APPARATUS FOR VIDEO CASSETTE TAPE RECORDER

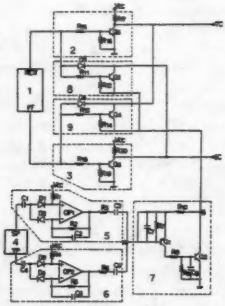
Jae H. Shin, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Filed Dec. 24, 1987, Ser. No. 946,029

Claims priority, application Rep. of Korea, Dec. 27, 1985, 17711/1985

Int. Cl.[5] B65H *59/38*; **G11B** *15/32*

U.S. Cl. 242—191 **3 Claims**



1. A reel motor braking apparatus for a tape recorder having a take-up reel motor and a supply reel motor, comprising:

control means for effecting a fast-forward operation and a rewind operation of said tape recorder, including means for applying a high level control signal to said take-up reel motor and a low level control signal to said supply reel motor in said fast-forward operation, and for applying a low level control signal to said take-up reel motor and a high level control signal to said supply motor in said rewind operation;

pulse generator means for producing pulse signals in response to the rotation of take-up and supply reels during said fast-forward and rewind operations;

converter means for converting said pulse signals into voltage signals;

reel-stop determining means, responsive to said voltage signals, for detecting the termination of reel rotation as an absence of said voltage signals and producing a stop signal in response thereto; and

control signal inversion means, responsive to said stop signal, for inverting the control signals applied to said take-up reel motor and said supply reel motor to effect braking of said take-up and supply reels.

4,988,057

DRAG DEVICE FOR A SPINNING REEL

Yasuhiro Hitomi, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Continuation of Ser. No. 308,993, Feb. 10, 1989, abandoned, which is a continuation of Ser. No. 89,123, Aug. 25, 1987, abandoned. This application Feb. 26, 1990, Ser. No. 489,744

Int. Cl.[5] A01K *89/027*

U.S. Cl. 242—245 **6 Claims**

1. A spinning reel, including

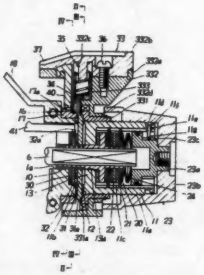
a spool shaft;

a spool supported on said spool shaft;

a reel body;

a support cylinder projecting from a rear portion of said reel body,

a drag device provided with a drag means for applying a rotational resistance to said spool shaft, said drag means comprising a first adjusting member and a second adjusting member for independently adjusting said rotational resistance applied to said spool shaft, said second adjusting member being supported rotatably with respect to said support cylinder, said support cylinder comprising a regulating means for regulating an adjusting operation range of said second adjusting member, said drag device comprising positioning means for ensuring accurate positioning of said second adjusting member at a substantially central position of said adjusting operation range regulated by



said regulating means, said positioning means comprising (i) only one engaging recess, said engaging recess being located at said substantially central position of said adjusting operation range regulated by said regulating means, said adjusting operation range having no other engaging recesses other than said one engaging recess, and (ii) only one engaging member of said second adjusting member, said engaging member being supported to said second adjusting member to a slidably movable radially of said support cylinder and engageable at its utmost end with said one engaging recess and a spring member for biasing said engaging member in a direction of engaging with said one engaging recess, whereby said central position of said adjusting operation range of said second adjusting member can be set.

4,988,058

METHOD AND APPARATUS FOR STEERING MOVING OBJECTS

Reinhard Dirscherl, Taufkirchen, and Ernst Lill, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

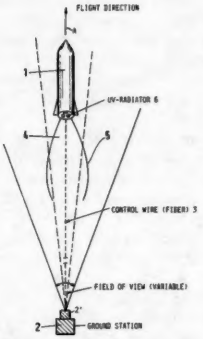
Filed Aug. 23, 1989, Ser. No. 397,719

Int. Cl.[5] F41G *7/26*

U.S. Cl. 244—3.16 **21 Claims**

1. A method for steering a remote controlled moving object, whereby the object is guided away from its start by means of an electro-optical sensor system which allows locating a position and therewith the moving object on its path, and wherein signals acquired from said electro-optical sensor system are transmitted to a signal processing and evaluating circuit for correspondingly producing steering commands in a ground station, said electro-optical sensor system comprising a UV-radiation sensitive sensor in a locating and object detection and recognition system including said signal processing and evaluating circuit, and which supplies its useful signal to a guidance computer for generating said steering commands, which are transmitted to said remote controlled moving object and which commands are converted in said remote controlled moving object for its steering, whereby respectively acquired image contents are compared in said guidance computer with stored image contents with reference to known signatures, and wherein said UV-radiation sensitive sensor is an image generat-

ing sensor (CCD) which recognizes UV-radiations and, depending upon a direction of incidence, provides signals to an image processing and evaluating circuit, whereby the evaluation is carried out by means of said guidance computer for generating said steering commands, and wherein said image generating sensor (CCD) has a large dynamic range which is



sensitive over a broad spectral range from UV to the near IR, wherein image contents are supplied to an image processing, preparing, and evaluating computer which has stored therein evaluating algorithms, so that previously known flying body radiation and movement characteristics lead to an unambiguous, error-free locating, especially over an entire flight path, by means of analysis of said image contents.

4,988,059

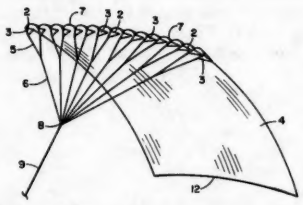
LARGE AREA SINGLE SURFACE DISPLAY KITE

Wesley N. Alleé, 1232 W. Memphis, Broken Arrow, Okla. 74012

Filed Aug. 28, 1989, Ser. No. 398,959

Int. Cl.[5] B64C *31/06*

U.S. Cl. 244—153 R **11 Claims**



6. A kite comprising:

a large sheet of material extending from a straight leading edge rearwardly to a trailing edge;

a pair of outermost struts, one at each end of said leading edge, extending at an inward angle rearwardly from said leading edge;

a plurality of parallel struts spaced between said outermost struts in a narrow band extending perpendicular to and rearwardly from said leading edge;

a plurality of keels, one extending downwardly from each of said struts to a lower tip thereof, said keels having leading edges substantially perpendicular to said leading edge of said sheet of material; and

a first plurality of bridle lines of equal length, each one connecting different adjacent pairs of said keel tips including those of said outermost keels, and a second plurality of bridle lines of equal length, each one extending from the midpoint of a different one of said first plurality of bridle lines to a single point of connection.

4,988,060

SOLAR COLLECTOR PANEL ARRANGEMENT WITH PARTLY AND FULLY FOLDABLE PANELS

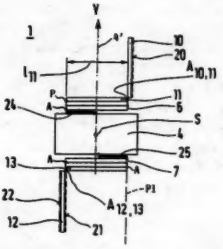
Juergen Janson, Ottobrunn; Otto-Heinz Gruber, Baldham, and Roland Cosaert, Munich, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 5, 1990, Ser. No. 489,286

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1989, 3907063

Int. Cl.[5] B64G *1/44*

U.S. Cl. 244—173 **11 Claims**



1. A solar collector panel system for a spacecraft having a central system axis, comprising a first panel wing connected to one side of said spacecraft, a second panel wing connected to an opposite side of said spacecraft, each panel wing comprising a wing tip outer panel remote from said spacecraft and a number of intermediate panels between said spacecraft and said outer panel, first mounting hinging means (**24, 25**) for mounting each panel wing to said spacecraft, second hinging means (A) for securing said intermediate panels to each other so that said intermediate panels are foldable alternately in opposite directions, whereby said intermediate panels extend perpendicularly to said central axis (**4'**) when said intermediate panels are fully folded and substantially along said central axis when said intermediate panels are fully unfolded, and third hinging means ($A_{10,11}$; $A_{12,13}$) for securing each outer panel to its neighboring intermediate panel, so that said outer panels in their partly unfolded state extend in parallel planes (P, P1) on opposite sides of said central axis, whereby a center of gravity (S) of said system remains substantially in the same position in all states of said system.

4,988,061

METHOD AND APPARATUS FOR THE AUTOMATIC CONTROL OF A GUIDED VEHICLE

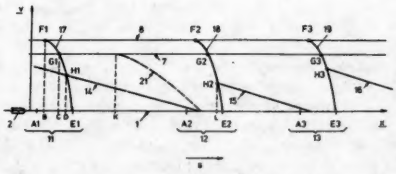
Luitpold Miller, Ottobrunn, and Herbert Jansen, Cologne, both of Fed. Rep. of Germany, assignors to Thyssen Industries AG, Cologne, Fed. Rep. of Germany

Filed Mar. 9, 1989, Ser. No. 320,966

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807919

Int. Cl.[5] B61L *27/04*

U.S. Cl. 246—182 R **11 Claims**



1. A method for operating a rail vehicle advanced by a driving means along a line having a line profile, along which

line a plurality of stopping regions are provided, said method comprising steps of:

setting said plurality of stopping regions at predetermined distances;

operating said vehicle between said stopping regions substantially at a normal speed;

maintaining the speed of said vehicle above a predetermined minimum speed at all time in a non-emergency running mode of said vehicle, said predetermined minimum speed being varied and lower than said normal operating speed and further being determined as a function of at least said line profile and the instantaneous distance of the vehicle from the next subsequent one of said stopping regions in the direction of travel of the vehicle, further, said predetermined minimum speed being set such that in case of emergency and said driving means stopped, said vehicle is still able to run by virtue of the inherent kinetic energy of the vehicle from any point of said line between any two of said stopping regions to arrive the next one of said subsequent stopping regions;

braking said vehicle during such travel in such a way that the vehicle comes to a standstill within said next subsequent stopping region;

said predetermined distances and said predetermined minimum speed being correlated in the manner that the stopping of said vehicle outside the stopping regions is prevented even in a case if failure of said driving means has occurred.

4,988,062

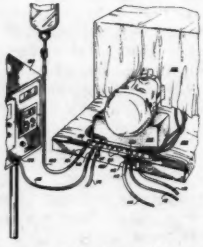
APPARATUS, SYSTEM AND METHOD FOR ORGANIZING AND MAINTAINING A PLURALITY OF MEDICAL CATHETERS AND THE LIKE

Robert A. London, 1252 Wellington Ter., Maitland, Fla. 32751

Filed Mar. 10, 1988, Ser. No. 166,104

Int. Cl.[5] A61M *5/14*

U.S. Cl. 248—68.1 **30 Claims**



1. A system for organizing, identifying and maintaining a plurality of tubes, catheters, monitoring lines or intravenous lines entering a patient's body during a medical procedure, comprising:

a patient support;

plural medical treatment apparatus at spaced locations near said patient support;

plural tubes, catheters, monitoring lines or intravenous lines, each extending at one, distal end from one of said treatment apparatus and interconnected with the patient's body;

a manifold movably coupled with the support, the manifold having plural openings, each opening receiving one of said tubes, catheters, monitoring lines or intravenous lines and holding all of them in an organized, spaced relation; and

coding means at the manifold and at the distal ends for identifying each tube, catheter, monitoring line or intravenous line with the corresponding one of said medical treatment apparatus.

4,988,063

SUPPORT AND POSITIONING ASSEMBLY FOR A SPRAY NOZZLE

Robert Pucillo, P.O. Box 557442, Miami, Fla. 33155-7441

Filed Jan. 27, 1989, Ser. No. 302,487

Int. Cl.[5] A47G *29/00*

U.S. Cl. 248—83 **9 Claims**

1. A support and positioning assembly for a spray nozzle used in cleaning a coil structure in an air conditioning unit, said assembly comprising:

a. a support portion removably positioned on and extending upwardly from a supporting surface,

b. a base portion having an elongated configuration and extending between and supported by opposite sides of said support portion,

c. a mounting means movably connected to said base and connected to the spray nozzle and structured for mounting the spray nozzle on the support portion,

d. said support portion including a support leg assembly supportingly connected to said base portion and adjustably positionable to raise or lower said base portion and said mounting means attached thereto relative to the supporting surface,

e. said mounting means and the spray nozzle attached thereto and movable along the length of said base portion and selectively raised or lowered with said base portion relative to the supporting surface,

f. whereby the spray nozzle is selectively positionable and supported in any one of a variety of positions for spray washing portions of the coil structure for a prolonged period of time,

g. said leg assembly comprising two leg structures each connected in supporting relation to an opposite end of said base portion and removably positionable relative to said base between a raised and a lowered position,

h. each leg structure being movable relative to a correspondingly positioned opposite end of said base portion between an upright, substantially transverse relation to said base portion and thereby defining said raised portion and an outwardly extending substantially angularly oriented position defining said lowered position, and

i. said mounting means comprising a mounting sleeve structured to removably receive and secure the spray nozzle therein, the spray nozzle being adjustable along its length relative to said sleeve.

4,988,064

TILTABLE TRIPOD STAND

Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan

Filed Mar. 2, 1989, Ser. No. 318,145

Claims priority, application Japan, May 16, 1988, 63-64304; Sep. 5, 1988, 63-116723

Int. Cl.[5] F16M *11/38*

U.S. Cl. 248—17 D **23 Claims**

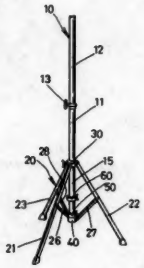
1. A tiltable tripod stand comprising:

a main post;

three tripod legs, the legs having respective upper ends for

being secured on the post, the legs having respective lower ends for resting on the surface on which the tripod stand is supported;

a respective articular arm pivotally attached at one location on each leg intermediate the ends of the leg and also pivotally attached at one location on the post, wherein movement of the upper ends of the legs with respect to the main post, through the articular arms, selectively folds the legs together to close the stand and opens the legs apart forming the bottom ends of the legs into a triangle which supports the tripod stand;



at least two upper holding members being supported on the main post, with at least one or the other of the upper holding members being movable along the main post;

two of the legs at the upper end thereof being pivotally connected with the one upper holding member and the third leg at the upper end thereof being pivotally connected with the other upper holding member, such that movement of the one upper holding member or the other upper holding member changes the shape of the triangle defined by the bottom ends of the tripod legs which tilts the main post toward one of the legs.

4,988,065

MOUNTING DEVICE FOR ORNAMENTAL OBJECT

Michael F. Leban, Norfolk, and John M. Giordano, Virginia Beach, both of Va., assignors to Signatures, Inc., Norfolk, Va.

Filed Jul. 10, 1989, Ser. No. 377,660

Int. Cl.[5] B60R *27/00*; F16M *11/14*

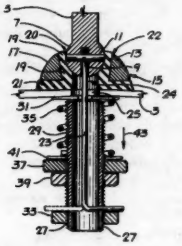
U.S. Cl. 248—181 **24 Claims**

1. A device for mounting an ornamental object to a panel of a vehicle comprising:

an ornamental object including a ball;

socket means for receiving said ball, said socket means mounted on said panel of said vehicle;

means for resiliently retaining said ball in said socket means;



wherein said ornamental object may be mounted in a plurality of positions.

4,988,066

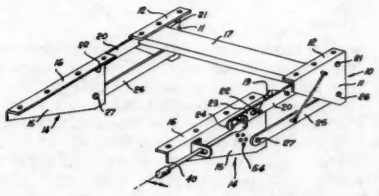
SELECTIVELY CONTROLLED KEYBOARD SUPPORT

Michael J. Cotterill, Unit 9, 141 - 151 Taren Point Road, Taren Point, New South Wales 2229, Australia

Filed Dec. 18, 1989, Ser. No. 452,048

Int. Cl.[5] E04G *3/00*

U.S. Cl. 248—281.1 **18 Claims**



1. A keyboard support apparatus of the kind having a mounting bracket, a support member, at least one linkage bar pivotally connected to the mounting bracket and to the support member whereby the support member and bar are adapted for movement in a vertical reference plane between a raised or lowered position relative to the mounting bracket, and locking means for immobilizing the apparatus against said movement; the locking means comprising first means defining a first formation associated with the support member; second means defining a second formation associated with the bar; said formations being inter-engageable to prevent movement of the bar relative to the support member, lever means acting to disengage said formations by lateral movement of the first means relative to the second means, and resilient means biasing said formations into inter-engagement.

4,988,067

ELECTRICAL BOX HANGER

Clarence E. Propp, Rte. 1, Box 120, College Station, Tex. 77840, and J. Russell Kerr, 19 Cargill La., Bryan, Tex. 77801

Filed Oct. 19, 1988, Ser. No. 259,921

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—343 **2 Claims**

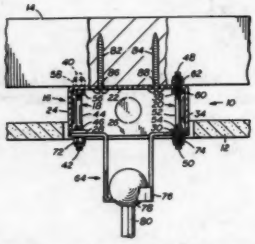
1. A hanger assembly for attachment to a construction member or a commercial ceiling fan support bar, said hanger assembly comprising:

(a) an electrical box, said electrical box comprising:

(1) a box back,

(2) a perimeter wall, said perimeter wall attached to and extending perpendicularly from the perimeter of said box back, said perimeter wall forming an open face opposite said box back,

(3) a first and a second box ear, each of said box ears extending perpendicularly from and attached to said perimeter wall within said open face,
(4) said first box ear having a first threaded ear hole therethrough in perpendicular alignment to said box back,
(5) said second box ear having a second threaded ear hole therethrough in perpendicular alignment to said box back,
(6) said box back having a first back hole and a second back hole, said first back hole corresponding to and in axial alignment with said first threaded ear hole and said second back hole corresponding to and in axial alignment with said second threaded ear hole, and
(b) a first and a second support rod, each of said support rods comprising:
(1) a first threaded end section adapted for threaded engagement in a said ear hole,
(2) a second threaded end section,
(3) a smooth section adjacent to said first threaded end



section, said smooth section having a smaller diameter than a minor diameter of said threaded sections for slideable engagement by said ear holes, and
(4) a spline section intermediate said smooth section and said second threaded end section, said spline section having a diameter greater than minor diameters of said threaded end sections with at least one spline being parallel to the main axis of said support rod,
(c) means securing said first threaded end sections of the respective support rods to said box back once said first threaded end sections have been inserted through the corresponding back holes, said means comprising a pair of nuts threadedly engaging each of said first threaded end sections of said first and second support rods on opposite sides of said box back,
(d) said spline sections of said first and said second support rods frictionally engaging said first and said second threaded ear holes, respectively, and
(e) means securing a load to said second threaded sections of said first and said second support rods.

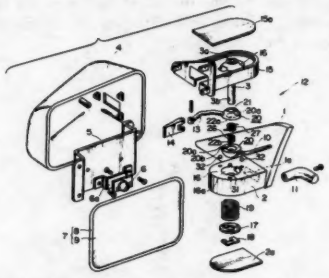
4,988,068

REMOTE CONTROL MECHANISM

Tohru Yamana, Fujieda, and Toshiaki Kikuchi, Shimizu, both of Japan, assignors to Murakami Kameido Co., Ltd., Shizuoka, Japan

Filed Jun. 9, 1988, Ser. No. 206,867
Int. Cl.[5] G02B *7/18*
U.S. Cl. 248—484 **8 Claims**

1. A remote control mechanism comprising:
a base;
a shaft erected on said base and having an outer periphery;
a ball joint pivotably mounted on said outer periphery of said shaft and consisting of a pair of vertically separable semi-spherical members, and a first clutch provided between opposed surfaces of said semi-spherical members;
a compression coil spring provided on said outer periphery of said shaft and between and perpendicular to the opposed surfaces of said semi-spherical members;
a pair of ball seats each with a respective semi-spherical cavity for holding said ball joint from above and below, and a second clutch provided between opposed surfaces of said ball seats;
compression spring means provided in a lower portion of said ball seats for providing forces of engagement to said first and second clutches;
a control lever having one end secured to an outer surface of one of said pair of semi-spherical members;



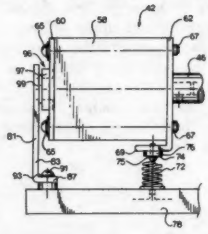
an operation arm having one end secured to an outer surface of the other one of said pair of semi-spherical members symmetrically with respect to said control lever; and
bracket means mounted on a free end of said operation arm and coupled to an operable member.

4,988,069

STEPPING MOTOR MOUNTING

Edmund D. D'Silva, Highland Park, Ill., assignor to Baxter International Inc., Deerfield, Ill.

Filed Nov. 27, 1989, Ser. No. 441,852
Int. Cl.[5] F04B *21/00*
U.S. Cl. 248—605 **15 Claims**



1. A stepping motor apparatus comprising:
a first bracket secured to a stepping motor, the first bracket being secured to a frame by means for dampening tangential forces; and
a second bracket secured to the frame, the second bracket being secured to the stepping motor by means for allowing rotational movement of the stepping motor while rigidly securing against other forces.

4,988,070

EXHAUST PIPE HANGER

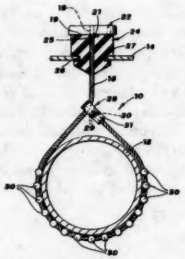
Raymond D. Hollinger, Richmond; James M. Dawson, Ortonville, and Edward A. Vaughan, Rochester, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 28, 1989, Ser. No. 399,793
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—613 **3 Claims**

1. An exhaust system for support from an opening in the undercarriage of an automotive vehicle comprising:
a tubular exhaust conduit;
a flexible, elongate cable member;

a flat, rigid retaining member fixedly attached to a first end of said cable member, normal to the axis thereof and having a dimension larger than said opening;

a resilient isolation member disposed about said cable member adjacent to said retaining member configured to engage said opening in an interference fit;



clip means fastened to a second end of said cable member and configured to detachably engage said cable member at a position intermediate of said first and second ends to form a loop about said exhaust conduit for support therein.

4,988,071

MOUNTING MECHANISM FOR AN AUTOMOTIVE AIR CONDITIONING COMPRESSOR

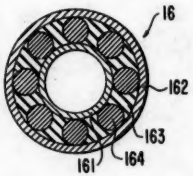
Seiji Shimazaki, Isesaki, and Soichiro Imai, Maebashi, both of Japan, assignors to Sanden Corporation, Gunma, Japan

Division of Ser. No. 109,863, Oct. 19, 1987, Pat. No. 4,834,336. This application Feb. 22, 1989, Ser. No. 313,503

Claims priority, application Japan, Oct. 17, 1986, 61-159074[U]; Dec. 17, 1986, 61-193020[U]

Int. Cl.[5] F04B *35/06*

U.S. Cl. 248—666 **6 Claims**



1. In a mounting mechanism for connecting a compressor of an automobile air conditioning system in a mounted position on an automobile engine, said mounting mechanism including a mounting bracket affixed to the engine, a flange portion projecting from an outer peripheral surface of the compressor, and bolt-nut mechanisms connectings between the mounting bracket and the flange portion of the compressor with a drive shaft of the compressor being disposed parallel to a drive shaft of the engine such that the compressor and the engine are spaced in a radial direction perpendicular to the axis of the drive shafts, the improvement comprising:

said mounting bracket having at least one first hole, said flange portion having at least one second hole, said first and second holes being aligned with one another in the mounted position of the compressor;

axial vibration absorbing means comprising a vibration absorbing material formed in the shape of a cylinder and disposed in one of said first and second holes for absorbing axial vibration of the compressor, a respective one of the bolts of said bolt-nut mechanisms passing through said axial vibration absorbing means to connect the mounting bracket to the flange portion; and

spacing means incorporated within said vibration absorbing means for fixing the radial spacing between the compressor and the engine and preventing radial deformation of the vibration absorbing means, said spacing means comprising a plurality of elements disposed within said cylinder of vibration absorbing material, extending generally radially in said cylinder and being substantially non-compressible in the radial direction, and said elements comprising at least three spherical members disposed at generally regular angular intervals.

4,988,072

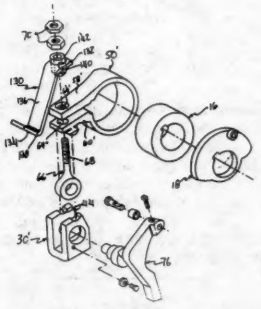
MOUNT ASSEMBLY FOR MECHANICAL PARTS

Florian I. Nowak, 16 Dean Dr., Newington, Conn. 06111

Continuation-in-part of Ser. No. 309,149, Feb. 13, 1989, Pat. No. 4,932,627, which is a division of Ser. No. 220,451, Jul. 18, 1988, Pat. No. 4,834,220, which is a continuation-in-part of Ser. No. 91,092, Aug. 31, 1987, Pat. No. 4,778,036. This application Jan. 8, 1990, Ser. No. 462,008

Int. Cl.[5] E04G *3/00*

U.S. Cl. 248—674 **9 Claims**



1. A mount assembly for mechanical parts, comprised of a mount with a body having means for mounting at least one part thereon, and having a base element adapted for abutment against an underlying support member, said base element being at the bottom of said body and said mounting means being disposed vertically thereabove with said base element abutted against such a support member; a hooking member comprising a bar of strong, rigid material formed to provide a hook portion adjacent one end and an engagement portion adjacent the other end thereof; and attaching means attaching said hooking member to said body to extend therefrom, said attaching means including an engagement element that extends upwardly beyond said mount and that is engaged with said engagement portion of said bar, said hooking member hook portion forming a recess opening in a generally upward direction, and being adapted to receive and engage a stationary element inserted into said recess to limit upward movement of said mount away from the support member.

4,988,073

EXCITATION COIL FOR A FUEL INJECTION METERING AND ATOMIZING VALVE ON AN INTERNAL COMBUSTION ENGINE

Marcello Cristiani, Imola, Italy, assignor to Weber S.r.l., Italy

Continuation of Ser. No. 275,206, Nov. 23, 1988, abandoned. This application Dec. 12, 1989, Ser. No. 449,464

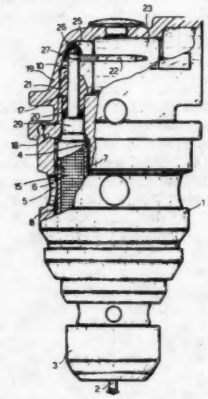
Claims priority, application Italy, Nov. 24, 1987, 53825/87[U]

Int. Cl.[5] F16K *31/06;* H01F *5/04*

U.S. Cl. 251—129.01 **4 Claims**

1. An excitation coil for electromagnetic fuel metering and atomizing valve on an internal combustion engine, said coil

substantially comprising: an annular winding (6) of electric wire for producing a magnetic field in a core (4) integral with said valve body (1); an anchor integral with a plunger (2), the ends (9) of said winding wire being connected electrically to a pair of pins (10) secured to a casing (8) housing said winding wherein, each said pin has an end (25) projecting outside said casing and each presents an axial hole (24) through which is threaded a respective end portion of said wire, the end of said



portion projecting from said end (25) of said pin and being connected to said end (25) by a weld (26); and

a cap mounted on said valve, forming a cavity (23), wherein the end (25) of each said pin is connected electrically to a conducting bar (22) projecting inside said cavity (23) and wherein one end of said bar presents a hole (27) in which is fitted said end (25) of a respective pin;

said weld spot (26) connecting said end of said bar (22) to the end of the respective pin.

4,988,074

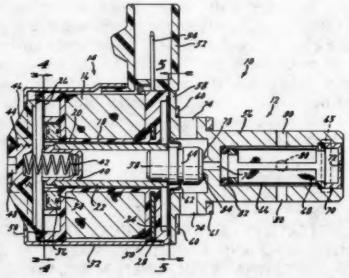
PROPORTIONAL VARIABLE FORCE SOLENOID CONTROL VALVE

Hamid Najmolhoda, Grandville, Mich., assignor to Hi-Ram, Inc., Coopersville, Mich.

Filed May 17, 1988, Ser. No. 194,787

Int. Cl.[5] F16K *31/08*; H01F *7/08*

U.S. Cl. 251—129.08 **26 Claims**



1. A proportional variable force solenoid valve for controlling the pressure of pressurized fluid in a fluid control system in proportion to the current level of an electrical input signal comprising:

a valve member including a movable valve adapted for controlling the pressure of pressurized fluid in said fluid control system;

a solenoid connected to said valve member, said solenoid including an armature having one end connected to said movable valve t o move said armature between first and second axial positions in accordance with the current level of said electrical input signal, an electromagnetic coil connected to said electrical input signal for generating an electromagnetic field and including a longitudinal bore hole extending therethrough, means for suspending said armature within said bore hole at each end of said armature for axial movement between said first and second axial positions, means for resiliently biasing said armature toward said first position, a permanent ring magnet magnetically coupled between one of said suspending means and said coil and adjacent one end of said armature, said permanent ring magnet producing a magnetic force in said second axial direction and substantially saturating said armature whereby said armature is axially moved between said first and second axial positions in proportion to the current level of said electrical input signal.

4,988,075

SEAL FOR VALVES OR FLANGES, IN PARTICULAR FOR VACUUM TECHNOLOGY

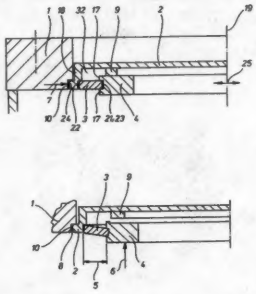
Hubert R. Bösch, Sandstrasse 29, 6890 Lustenau, Austria

Filed Oct. 12, 1989, Ser. No. 420,476

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1988, 3834913

Int. Cl.[5] F16K *1/36*

U.S. Cl. 251—158 **6 Claims**



1. Seal for flanges, especially in vacuum technology, having at least two facing sealing surfaces, arranged at a flange and at a washer, against which an axially displaceable sealing element in the form of a cup spring is positioned, said seal comprising said washer having an annular bulge which is radially deformable in the elastic state; said cup spring being positioned between an axially displaceable ring of a smaller diameter and said annular bulge of said washer, said cup spring being arranged, so that in the open state of the flange at a certain angle of approximately 12°, enough distance is provided, so that the outer diameter of the cup spring touches the inner diameter of said annular bulge and the inner diameter of the cup spring touches said axially displaceable ring in a generally axial direction, so that when the cup spring is in the locked position, it transfers eh sealing force from the axially displaceable ring to the annular bulge of the washer in a radially outward direction onto a sealing line; said cup spring, while in the closed state, being completely pressed through and located at dead center and thus being positioned for a theoretically infinite transmission of forces, axial to radial.

4,988,076

VALVES HAVING A TURNABLE CLOSURE MEMBER SUCH AS A BUTTERFLY VALVE

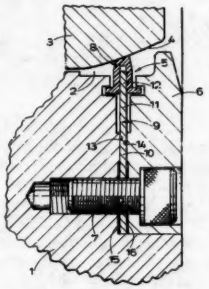
Philip J. Burton, Birmingham, England, assignor to Charles Winn (Valves) Limited, England

Filed Jan. 10, 1990, Ser. No. 462,825

Claims priority, application United Kingdom, Jan. 10, 1989, 8900449

Int. Cl.[5] F16K *1/22*

U.S. Cl. 251—306 8 Claims



1. A valve comprising a valve housing formed with an axially extending valve passage, a valve seat assembly carried by said valve housing and circumscribing said valve passage, a turnable closure member rotatably mounted in said passage for effecting a seal with said valve seat in a closed condition of said closure member, said valve seat assembly comprising in radial section thereof a radially inwardly-extending arm of resilient material, said arm comprising a radially inner portion, a radially intermediate portion, and a radially outer portion, said outer portion being rigidly clamped to said valve housing, said radially intermediate portion being capable of deflecting relative to said outer portion to facilitate axial movement of said radially inner portion, and a sealing head of polymeric material mounted on said radially inner portion of said arm, said sealing head being of U-section comprising a base and two limbs, said base being engageable with said closure member in said closed condition of said closure member for effecting a seal therewith, and said limbs embracing said radially inner portion.

4,988,077

REINFORCED PLASTIC VALVE

Richard W. Conley, and Richard P. Tremblay, both of Pittsburgh, Pa., assignors to Kerotest Manufacturing Corp., Pittsburgh, Pa.

Continuation of Ser. No. 308,787, Feb. 8, 1989, abandoned, Ser. No. 873,712, Jun. 12, 1986, abandoned, and Ser. No. 740,228, Jun. 3, 1985, abandoned. This application Feb. 23, 1990, Ser. No. 483,924

Int. Cl.[5] F16K *5/04*

U.S. Cl. 251—309 2 Claims

1. A reinforced plastic valve comprising:

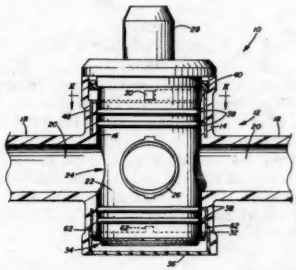
a generally cylindrical unitary valve body formed of a molded plastic material having deformable creep properties under pressure, said unitary valve body having a generally cylindrical axially extending interior chamber, said valve body interior chamber having an inner cylindrical wall;

a pair of flow lines each extending into said interior chamber of said valve body;

a flow isolation member having valve seats and a generally cylindrical configuration throughout its length, said flow isolation member mounted in said generally cylindrical chamber and rotatably movable to control the flow of fluid through said flow lines;

seal members positioned on said flow isolation member above and below said flow lines in sealing contact with said valve body inner cylindrical wall;

said valve body including a metal reinforcing member that has deformable creep properties substantially less than the creep properties of said plastic material forming said valve body, said reinforcing member embedded during the molding process within said molded plastic material and encapsulated by said molded plastic material, said reinforcing member being of generally cylindrical shape and having upper and lower portions extending circumferentially within said valve body at locations opposite said seal members on said flow isolation member and on each side of said flow lines and a circumferentially extending intermediate portion having diametrically opposed openings for alignment with said flow lines, said upper portion, said lower portion and said intermediate portion being integrally formed into a metal sleeve having a cylindrical shape extending concentrically with said valve body so that said valve seats will maintain the desired relationship with said valve body;



said reinforcing member preventing creep of said valve body and providing dimensional stability to said valve body to thereby maintain sealing contact between said seal members and said valve body inner cylindrical wall; and

said flow isolation member mounted for rotation within said chamber, said flow isolation member having at least one radially extending stop means, said reinforcing member having at least one axially extending shoulder means, said shoulder means operable to limit rotation of said flow isolation member and sever said radially extending stop means on said flow isolation member on over torquing of said flow isolation member.

4,988,078

HIGH FLOW RATE MINIATURE VALVE

John H. Otteman, 4005 Hecker Pass Hwy., Gilroy, Calif. 95020

Filed Jul. 24, 1989, Ser. No. 384,716

Int. Cl.[5] F16K *27/02*

U.S. Cl. 251—367 4 Claims

1. A valve for controlling the flow of fluid, comprising:

a valve body consisting of a first part and a second part;

said first part consisting of a seamless unitary body including an internal valve which forms an internal actuator passage, said actuator passage extending along an actuator axis, a cylindrical assembly port extending along a flow axis, and an exit port extending parallel to said flow axis opposite to said assembly port, said flow axis being normal to said actuator axis, said passages intersecting one another, and a peripheral shoulder lying in a plane normal to said flow axis facing away from said exit port;

said second part consisting of a seamless unitary body having a mounting end and a free end, an internal flow passage, an inlet port to said flow passage, and an outlet from said flow passage, said flow passage extending parallel to said flow axis when said body parts are assembled to one another, and a peripheral valve seat aligned with said flow passage and lying in a plane normal to said actuator axis,

the free end of said second part being spaced from said exit port and also spaced from said internal wall of said first part whereby to form a flow chamber from the valve seat to said exit port, and a peripheral flange around said second part adjacent to the mounting end of said second part so disposed and arranged as to contact said shoulder on the first part to index their relative mounted locations, said parts being joined at said shoulder and flange, comprising the only joinder of said two parts, said free end of said second part thereby being cantilevered to freely project into said first part without other contact with it;

closure means closing said actuator passage; and

valve actuator means in said actuator passage controllably adapted to open or to close the valve to flow past said valve seat.

4,988,079

APPARATUS FOR SMELTING AND REDUCING IRON ORES

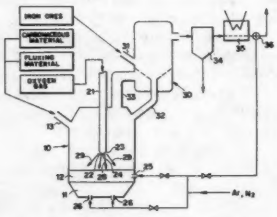
Kenji Takahashi; Katsuhiro Iwasaki; Shigeru Inoue; Haruyoshi Tanabe; Masahiro Kawakami; Kenzo Yamada, and Ichiro Kikuchi, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Division of Ser. No. 246,456, Sep. 19, 1988, Pat. No. 4,936,908. This application Apr. 3, 1990, Ser. No. 503,805

Claims priority, application Japan, Sep. 25, 1987, 62-240183; Oct. 15, 1987, 62-260603; Oct. 15, 1987, 62-260604; Oct. 15, 1987, 62-260606

Int. Cl.[5] F27B *17/00*

U.S. Cl. 266—156 **4 Claims**



1. Apparatus for smelting and reducing iron ores, comprising:

preheat and prereduction furnace means for preheating and prereducing iron ores, and for generating hot exhaust gas;

smelting reduction furnace means, into which iron ores, carbonaceous material and fluxing material are charged, for smelting and reducing the iron ores charged therein;

a top-blow oxygen lance through which oxygen gas is blown in into the smelting reduction furnace means, said oxygen lance having decarbonizing nozzles and post combustion nozzles;

said smelting reduction furnace means having bottom tuyeres and side tuyeres for blowing in stirring gas, said bottom tuyeres being built in a bottom portion of said smelting reduction furnace means and said side tuyeres being built in a side wall portion of said smelting reduction furnace means;

hot cyclone means for removing dust from said exhaust gas generated from said preheat and prereduction furnace means;

means for feeding exhaust gas, from which dust has been removed, to said bottom and side tuyeres for use as a stirring gas; and

steam generator means for generating steam from heat of said exhaust gas generated from said preheat and prereduction furnace means.

4,988,080

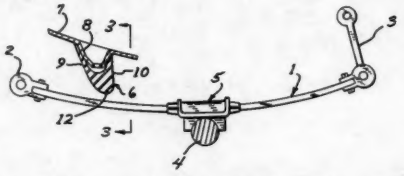
VARIABLE RATE LEAF SPRING CONSTRUCTION

Rashmikant P. Shah, Wauwatosa, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Aug. 25, 1989, Ser. No. 399,163

Int. Cl.[5] F16F *3/10*

U.S. Cl. 267—30 **11 Claims**



1. A variable rate spring construction for a vehicle, comprising a leaf spring composed of a single leaf of fiber reinforced resin, connecting means for connecting the ends of the spring to a vehicle frame, axle mounting means for connecting the central portion of the spring to a vehicle axle, and a resilient bumper having an upper end connected to the frame of the vehicle and disposed to engage the upper surface of the leaf springs under load conditions, said bumper being tapered downwardly with the upper end of the bumper having a larger longitudinal dimension than the lower end and the lower end terminating in a generally rounded tip, said bumper having a low spring rate on initial axle travel during loading and having a higher spring rate at a second position of axle travel during increased loading prior to reaching a maximum position of axle travel.

4,988,081

IMPACT DAMPER FOR A MOTOR VEHICLE

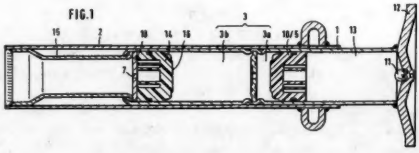
Wolfgang Dohrmann, Eitorf, Fed. Rep. of Germany, assignor to Boge AG, Eitorf, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,039

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1989, 3901449

Int. Cl.[5] F16F *9/16*; B60R *19/02*

U.S. Cl. 267—64.15 **17 Claims**



1. An impact damper for a motor vehicle having outer tubular means and inner tubular means, said inner tubular means being disposed within a portion of said outer tubular means, said impact damper having means for attachment to a portion of the body of a motor vehicle;

said impact damper having means for attachment to a portion of the motor vehicle being impacted upon during a collision;

means for interacting with a relative movement of said inner tubular means for transferring forces produced during impact with at least one of said outer tubular means and said inner tubular means;

fluid means disposed for transferring at least a portion of forces upon the tubular means, for absorbing forces of impact to said fluid means during impact for slowing down the motor vehicle during a collision;

means for confining sad fluid means within said impact damper;

at least one of said inner tubular means and said outer tubular means having an interface portion for interfacing with said fluid means;

means for retaining said inner tubular means in a predetermined position relative to said fluid means and said at least one outer tubular means at times when said forces of impact are not present;

said means for retaining also being for retaining a position of said inner tubular means with respect to said outer tubular means, said retaining means being disposed such that said inner tubular means is movable with respect to said outer tubular means; and

said confining means having means for opening a flow route for the fluid means to flow out of the impact damper, said means for opening the flow route being activatable at temperatures at least as great as 200° C.

4,988,082

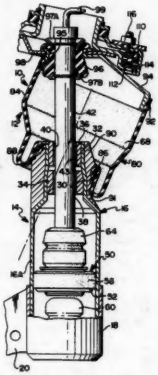
SPLICED AIR SLEEVE ASSEMBLY FOR AIR SPRING DAMPER

James M. Pees, Centerville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 18, 1989, Ser. No. 381,229

Int. Cl.[5] F16F *9/04*

U.S. Cl. 267—64.240 **7 Claims**



1. A suspension device for a vehicle, comprising:

(a) a damper having relatively movable telescopic parts including

(i) a rigid tubular member,

(ii) a piston assembly mounted inside the tubular member for stroking movement,

(iii) a piston rod connected to the piston assembly and extending through one end of the tubular member,

(b) air sleeve means having

(i) a first tubular sleeve constructed from a corded elastomeric material;

(ii) a second tubular sleeve constructed from a corded elastomeric material and connected to the first sleeve, wherein the cord angles of the first and second sleeves are selected so that the inflated diameter of the second tube is greater than the inflated diameter of the first tube;

(c) first fastener means for securing a lower portion of the first sleeve in an airtight manner with respect to the tubular member, wherein a rolling lobe is provided in the portion of the first sleeve between the first fastener means and the second sleeve; and

(d) a second fastener means for securing an upper portion of the second sleeve in an airtight manner with respect to the piston rod so that the first and second sleeves form a closed chamber for receiving pressurized fluid, the chamber surrounding a portion of the damper to provide an air spring capable of yieldably resisting telescopic movement with the damper.

4,988,083

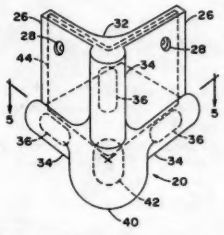
BUMPER FOR A CORNER

Warren L. Bradley, Street, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 5, 1989, Ser. No. 402,728

Int. Cl.[5] F16F *1/52*

U.S. Cl. 267—140 **16 Claims**



1. A bumper for mitigating the shock on a corner of a transportable object during a collision, comprising:

adjacent wall sections adapted to be mounted upon a corner of a transportable object, the wall sections generally defining an apex;

deflectable protrusions disposed between and extending outwardly of the adjacent wall sections, wherein said protrusions have cavities; and

a deflectable protuberance disposed at the apex extending outwardly of the protrusions.

4,988,084

SPRING ELEMENT FOR CONNECTING TWO COMPONENTS WITH ANGLE OF ROTATION MOBILITY

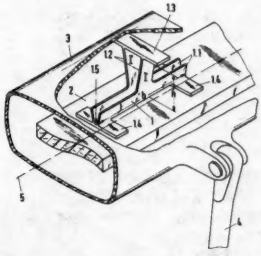
Alois Wagner, Emmerkofen, and Otmar Friedberger, Neubiberg, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, München, Fed. Rep. of Germany

Filed Jul. 21, 1989, Ser. No. 383,922

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824816

Int. Cl.[5] B25B *1/00*; F16B *7/00*

U.S. Cl. 267—160 **5 Claims**



1. A spring element for connecting first and second components, the two components having substantially the same direction of extension, with the first component being fixed relative to the second component, the second component being angularly movable relative to the first component, the spring element comprising a T-shaped sectional piece extending in the direction of extension of the components, the T-shaped sectional piece comprising a base section extending in the direction of extension and a section extending substantially perpen-

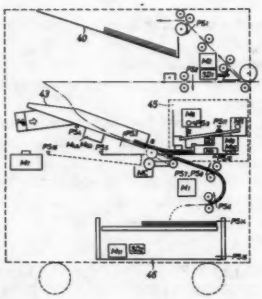
dicularly from the base section to form the T-shaped sectional piece, the section extending substantially perpendicularly from the base section having a first connecting means for connecting the section extending substantially perpendicularly from the base section to the second component, and the base section having torsional flexibility and further comprising a connecting means disposed at each end of the base section for connecting the base section to the first component.

4,988,085

RECORDED SHEET HANDLING APPARATUS

Yoshikazu Maekawa, Hachioji; Takeshi Muramatu, Sayama; Toshio Yokoyama, Kiyose, and Shigemi Yukizane, Chofu, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Feb. 8, 1989, Ser. No. 307,455
Claims priority, application Japan, Feb. 9, 1988, 63-26698
Int. Cl.[5] B42B *2/00*
U.S. Cl. 270—53 5 Claims



1. A recorded sheet handling apparatus comprising:

means for temporarily holding a set of recorded sheets externally fed one by one;

a moving mechanism for moving the recorded sheets by a predetermined distance in a direction perpendicular to a recorded sheet convey direction prior to stapling when a size of the recorded sheets is a predetermined size;

at least one of respectively means for punching and means for stapling the set of recorded sheets while the sheets are held by the recording means; and

means for conveying the copied sheets from said one means so as to discharge the sheets.

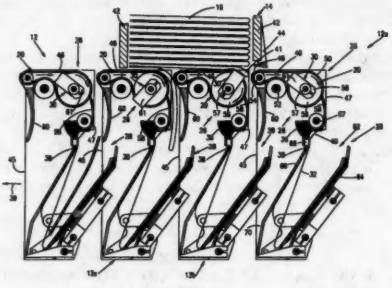
4,988,086

APPARATUS AND METHOD FOR FORMING SHEET MATERIAL ASSEMBLAGES

James R. Schlough, Troy, Ohio, assignor to AM International Incorporated, Chicago, Ill.

Filed Jan. 26, 1989, Ser. No. 302,826
Int. Cl.[5] B65H *5/30*
U.S. Cl. 270—55 68 Claims

1. An apparatus for forming sheet material assemblages, said apparatus comprising means for holding a plurality of stacks of sheet material, a plurality of receiving locations, means for sequentially moving each of said receiving locations past each of the stacks of sheet material in turn, a plurality of feeder means for feeding sheet material from the stacks of sheet material to the receiving locations, each of said feeder means being operable to feed sheet material from each stack of the plurality of stacks of sheet material, and means for sequentially moving



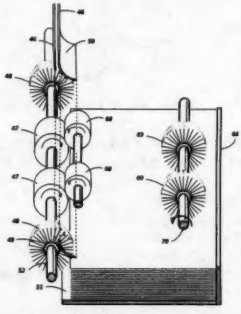
said plurality of feeder means past each of the stacks of sheet material in turn.

4,988,087

SHEET STACKER

Peter A. Sardano, Fairport; David J. Fish, Webster, and Gerard R. Sturnick, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 3, 1989, Ser. No. 375,077
Int. Cl.[5] B65H *29/22*
U.S. Cl. 271—314 24 Claims



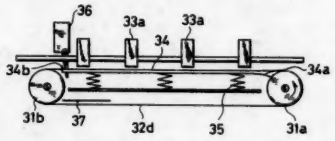
1. A sheet stacker comprising a generally horizontal stacking platform having an inboard and an outboard end, an arcuate turn baffle at the inboard end of said platform for guiding and turning sheets onto said platform, said arcuate turn baffle having its convex side forming a drive nip with a sheet drive assembly comprising a rotatable drive shaft having fixedly mounted thereto at least one cylindrical compressible foam drive roll and at least two cylindrical fiber brushes one at each end of said at least one foam roll, the diameter of the fiber brushes being greater than the diameter of the foam drive roll whereby said fiber brushes when rotated urge the lead edge of a sheet being fed generally vertically downward toward the nip formed between the foam roll and said baffle to enable the foam rolls to actively drive the sheet through the nip around the turn baffle onto the support platform and toward the outboard end.

4,988,088

SHEET TURNING DEVICE

Masahiko Aiba, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 1, 1989, Ser. No. 430,148
Claims priority, application Japan, Nov. 4, 1988, 63-279145
Int. Cl.[5] B65H *29/00*
U.S. Cl. 271—186 8 Claims



1. A sheet turning device in a sheet transporting path for receiving a sheet transported in a predetermined direction, turning said sheet and transporting said sheet in said direction, comprising:

a pair of rollers disposed on opposite sides of said sheet transporting path along said predetermined direction,

a belt extending between said rollers for turning said sheet,

means for stopping said sheet transported onto the lower inner surface of said sheet turning belt,

means for circulating said sheet turning belt to transport said sheet kept on the lower inner surface of said sheet turning belt in a direction orthogonal to said predetermined direction so that said sheet turns,

a pressing member for stopping and pressing said sheet which is turning and moving, on the upper inner surface of said sheet turning belt, and

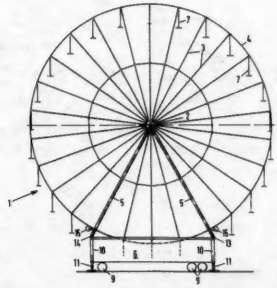
a sheet transporting roller for pressing said sheet against said pressing member to transport said sheet pressed by said pressing member in said predetermined direction in spite of pressing said sheet against said upper inner surface by said pressing member.

4,988,089

FAIRGROUND ATTRACTION

Hette Knijpstra, Terband, Netherlands, assignor to Knijpstra Konstruktie B.V., Terband, Netherlands

Filed Oct. 17, 1989, Ser. No. 422,580
Claims priority, application Netherlands, Mar. 23, 1989, 8900728
Int. Cl.[5] A65G *1/00*
U.S. Cl. 272—29 21 Claims



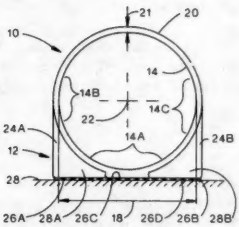
1. In a portable Ferris wheel apparatus for use in amusement parks and the like, having a main shaft for the wheel, carrier supports for carrying a bearing for the main shaft, spokes radiating from the bearing, cross-head members for connecting to the free ends of the spokes and carrying bars supported by the cross-head members and spokes for carrying a passenger car or gondola, the improvement comprising three wheeled carriages of a size and configuration such that the carriages may be transported on a public road and placed in side-by-side relationship to each other on ground at which they are to rest when the Ferris wheel is to be erected and operated, a first of said carriages being configured so as to be positionable as a first outer carriage, a further of said carriages being configured so as to be positionable as a further outer carriage, and a second carriage being configured so as to be positionable as a second inner carriage between said first and further outer carriages, the first outer carriage and the further outer carriage being configured so as to contain the carrier supports and having carrier supports lifting means for lifting from and replacing in the said first and further outer carriages the said carrier supports and the second inner carriage being configured so as to contain the spokes and having spoke lifting means for lifting from and replacing in said second inner carriage the spokes.

4,988,090

PORTABLE, SAFETY, PLAY FURNITURE ASSEMBLY

Marcella H. Schmitt, 190 S. Wood Dale Rd., Apt. 706, Wood Dale, Ill. 60191

Filed Mar. 23, 1989, Ser. No. 328,088
Int. Cl.[5] A63B *9/00*
U.S. Cl. 272—56.5 R 25 Claims



21. A portable, safety, play furniture assembly, comprising:

a relatively light weight chair body having

a smooth, glass-like, impact and splinter resistant, closed, concave interior surface with a portion for underlying supporting of a person and a width measured between opposed portions for lateral supporting of a person reposing therein,

said interior surface body having a depth which is approximately one-half that of the width, and

an exterior surface connected to and protectively surrounding said smooth, glass-like, concave interior surface; and

a chair base for supporting the chair body against rolling and tipping, said chair base having

legs with feet for engagement with an underlying floor,

a chamber for receipt of ballast to selectively increase the stability of the chair body, and

means for mounting said legs to the outer surface of the cylindrical body with said feet spaced from each other at opposite sides of the interior surface by a minimum distance approximately equal to the width of the interior surface, said feet substantially spanning at least the entire depth of the interior surface to protect against tipping.

4,988,091

ELBOW AND FOREARM REHABILITATION DEVICE

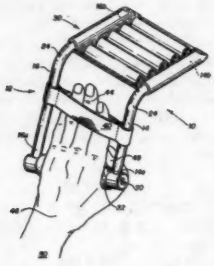
Michael J. Schaefer, 2672 Honeysuckle Dr., Richardson, Tex. 75082

Filed Jul. 27, 1990, Ser. No. 558,749
Int. Cl.[5] A63B *23/12, 21/065*
U.S. Cl. 272—67 20 Claims

10. An elbow and forearm rehabilitation device to be grasped by a hand of a user, comprising:

a frame including first and second side members, each having a first end proximal the user and a second end distal the user;

a hand grip interconnected to said first proximal ends of said first and second side members for receiving the hand of the user between said first and second side members;



said first and second side members including a bend disposed between said first proximal and second distal ends;

weights disposed adjacent said second distal ends of said side members; and

means for receiving the fingers of the user, said finger receiving means being disposed between said side members adjacent and spaced apart from said hand grip.

4,988,092

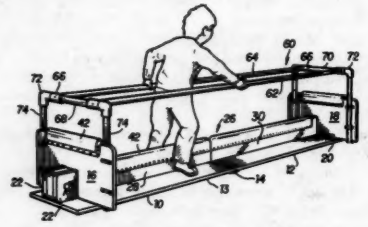
BREAK-DOWN THERAPEUTIC WALKER WITH FOOT SEPARATOR

Travis Trout, P.O. Box 131, Meridian, Tex. 76665

Filed Feb. 28, 1989, Ser. No. 316,804

Int. Cl.[5] A63B *3/00*

U.S. Cl. 272—70 **8 Claims**



1. A therapeutic walker comprising

a floor plate upon which a patient may walk,

a center board extending vertically upward from the floor plate and lengthwise along a center plane thereof, for keeping the feet of the patient apart,

a pair of end plates supporting respective ends of said center board,

a pair of spaced longitudinal hand rails, extending parallel to said center board,

means for connecting said rails to said end plates, and means for releasably connecting each of said end plates to a respective end of said floor plate,

wherein each of said end plates has an aperture therein for receiving a respective end of said center board, and said connecting means is applied to a portion of the center board extending through the aperture.

4,988,093

FLUID-FILLED NECK EXERCISER

Charles P. Forrest, Sr., 1306 St. Stephens Rd., Mobile, Ala. 36603, and John L. Stump, 401 N. Section St., Fairhope, Ala. 36532

Filed Jan. 19, 1990, Ser. No. 467,171

Int. Cl.[5] A63B *23/025*

U.S. Cl. 272—94 **5 Claims**

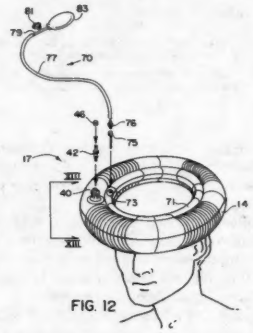


FIG. 12

1. An improved neck exercising device for exercising substantially the entire neck musculature comprising:

(a) a substantially flexible annular member having a first inner chamber, a fill port and a closure removably attachable over said fill port; and

(b) a head supporting device further comprising an inflatable bladder adjacent said annular member, said inflatable bladder having a second inner chamber and an air valve means for adjustably inflating or deflating said inflatable bladder;

(c) wherein said first inner chamber is isolated from said second inner chamber during all modes of operation.

4,988,094

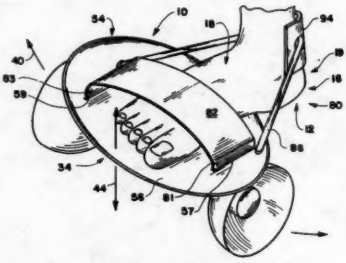
AQUATIC EXERCISE APPARATUS

Bob L. Beasley, 1217 Terra Mar Dr., Tampa, Fla. 33613

Filed Sep. 6, 1988, Ser. No. 241,046

Int. Cl.[5] A63B *21/00*

U.S. Cl. 272—116 **11 Claims**



8. An aquatic exercise apparatus for use by an exerciser in a body of water, comprising:

handgripping means for gripping the apparatus by the hand of the exerciser with said handgripping means having longitudinal dimension extending between a first end and a second end;

a first and a second fluid resistance means secured at said first end and said second end of said handgripping means, respectively, such that in use when said handgripping means is gripped by the hand of the exerciser and moved

by the arm of the exerciser in a first plane extending through said longitudinal dimension of said handgripping means resistance to such movement is increased;

said first and second fluid resistance means secured at said first end and said second end of said handgripping means, respectively, each defining a cup shaped member;

a third fluid resistance means secured to said handgripping means in a plane parallel to said first plane to form an opening defined by said third fluid resistance means and said handgripping means for receiving in use a portion of the hand of the exerciser such that in use when said handgripping means is gripped by the hand of the exerciser and moved by the arm of the exerciser in a second plane perpendicular to said first plane resistance to such movement is increased;

said third fluid resistance means being a flat plate member which extends in a plane parallel to said first plane;

a foot attachment means secured to said flat plate member for detachably securing the apparatus to a foot of the exerciser such that in use upon movement of the apparatus by the leg of the exerciser in said second plane, resistance to such movement is increased by said flat plate member and movement of the apparatus by the leg of the exerciser in said first plane is resisted by said closed cup shaped members such that resistance to such movement is increased;

said foot attachment means includes a strap member for securing the top of the foot of the exerciser to the apparatus and an ankle member for securing the ankle of the exerciser to the apparatus; and

said closed cup-shaped members being resilient such that in use when the foot of the exerciser is inserted into a slot formed between said flat plate member and said foot strap member, the cup-shaped members resistantly engage said flat plate member to provide a gradually increasing resistance to a continued spacing apart of said strap member relative to said flat plate member thereby increasingly tensioning said strap member against the top of the foot of the exerciser.

4,988,095

EXERCISE APPARATUS

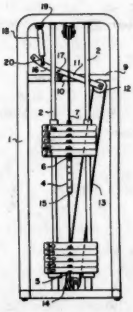
Carlo V. G. Ferrari, 51 Hyde Crescent, Hendon, London, NW. 9,, United Kingdom

Filed May 17, 1989, Ser. No. 352,896

Claims priority, application United Kingdom, Feb. 7, 1989, 8902631

Int. Cl.[5] A63B *21/06*

U.S. Cl. 272—118 **18 Claims**



1. An exercise apparatus, comprising:

a weight stack for providing an amount of resistance, wherein said weight stack is mounted for vertical movement on a frame;

weight lifting means operatively connected to said weight stack for lifting at least a portion of said weight stack against said amount of resistance by an user;

a compressible gas spring having a range of movement, said gas spring being compressible against a substantially uniform force rating over said range of movement, said gas spring being connected to said weight lifting means for increasing the amount of resistance for the user to lift said portion of the weight stack; and

a pivot lever pivotally connected to said frame, wherein one end of said gas spring is connected to said frame and the other end of said gas spring is selectively connected to said pivot lever for providing a desired amount of resistance, said weight stack being connected to said gas spring through said pivot lever so that lifting of said portion of said weight stack causing rotation of said pivot lever, and said gas spring applying torque to said pivot lever in a direction for resisting said rotation of said pivot lever.

4,988,096

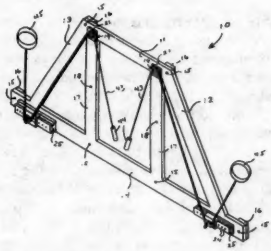
MUSCULAR STRETCHING APPARATUS

David W. Jones, Rte. #2, Box 714 Nettie Dr., Ashland City, Tenn. 37015

Filed Aug. 7, 1989, Ser. No. 390,981

Int. Cl.[5] A63B *21/06*

U.S. Cl. 272—118 **7 Claims**



1. A muscular leg stretching apparatus comprising, in combination,

a framework arranged for securement to a support structure including an upper beam spaced medially above a lower beam, the framework including a right and left vertical beam arranged parallel to one another and orthogonally joined at the respective upper and lower terminal ends to the upper and lower beams respectively, and

right and left upper guide means secured to a respective right and left intersection defined by an upper junction of an upper terminal end of each respective right and left vertical beam with the upper beam, and

a right and left lower guide means secured to the lower beam exteriorly of a lower right and left junction defined by the intersection of the lower terminal ends of each right and left horizontal beam with the bottom beam, and

a right and left flexible line respectively directed through each respective right and left upper and lower guide means, the right and left flexible line including a leg strap at an outer terminal end of each line and a weighted resistance member secured to an inner terminal end of each line, and

wherein each upper guide means includes a square support plate with a "U" shaped guide strap overlying the support plate, and an upper fastener directed medially through the guide strap and the support plate and received within an upper aperture formed through the upper beam wherein the fastener includes an upper guide pulley rotatably mounted thereabout.

4,988,097

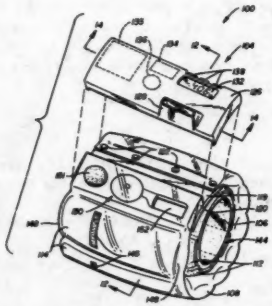
COMBINATION EXERCISE AND REFRESHMENT DEVICE

Robert W. Smith, San Jose; John J. McIntyre, Foster City, and Marland Chow, Huntington Beach, all of Calif., assignors to Actiwear, Ltd., Mission Viejo, Calif.

Continuation of Ser. No. 861,530, May 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 681,671, Dec. 14, 1984, abandoned. This application Apr. 27, 1988, Ser. No. 188,086

Int. Cl.[5] A63B *21/065*

U.S. Cl. 272—119 **21 Claims**



1. A variable weight arm and shoulder exercise and personal refreshment device, comprising a liquid tight container dimensioned and configured to encircle closely a user's wrist and having a capacity to hold sufficient liquid when full to provide enhanced exercise to the user's arm and shoulder when the user's arm and shoulder are moved while said variable weight arm and shoulder exercise and personal refreshment device is worn by the user, said liquid tight container having an outer-wall and an inner wall, a valve mounted on the outer wall, said valve extending through the outer wall to communicate with an interior of said liquid tight container, a mouthpiece at said valve to receive liquid through the valve, said mouthpiece being located on the outer wall over said valve, extending from the outer wall a sufficient distance for engagement by the user's mouth, terminating proximate to the outer wall and further being located so as to be accessible to the user by positioning the outer wall in front of the user's mouth with said device on the user's wrist, said valve being movable between an open and a closed position through application of force by the user's mouth on said mouthpiece, and means for fixedly attaching said liquid tight container in place encircling the user's wrist free of adjustment as liquid is withdrawn from the container through said valve and said mouthpiece by the user with said mouthpiece accessible to the user by positioning the outer wall in front of the user's mouth.

4,988,098

ROTATOR CUFF EXERCISE MACHINE

James M. Miller, Grand Prairie, Tex., assignor to Sport Supply Group, Inc., Farmers Branch, Tex.

Continuation of Ser. No. 427,195, Oct. 26, 1989, abandoned. This application Aug. 15, 1990, Ser. No. 569,361

Int. Cl.[5] A63B *21/00*

U.S. Cl. 272—134 **9 Claims**

1. A machine for exercising the rotator cuff of a user, comprising:

a frame;

a body support member spaced from the frame and including a seat for supporting the user in a seated position facing transversely to the frame;

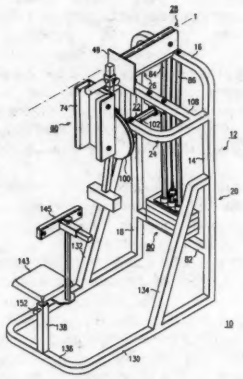
a load supported on the frame;

an input mechanism that is operably coupled by a cable and a system of pulleys for enabling the user to perform rotator cuff exercises against said load while in the seated position, the input mechanism comprising:

a shaft supported by the frame and including an end;

a forearm support assembly rotatable with the shaft, the forearm support assembly for supporting a forearm of the user and including a bar member attached to the shaft end and having first and second ends, a handle secured adjacent the first end and means at the second end for stabilizing the forearm support assembly during rotation;

a cam journaled to the shaft and rotatable therewith and including a face having first and second sets of diametrically opposed alignment holes, the cam further including a periphery to which an end of the cable is tethered such that the forearm support assembly is freely rotatable in a 360 degree manner with respect to the cam to enable the user to locate the handle in an initial downward position or an initial upward position while remaining in the seated position; and



adjustment means supported by the forearm support assembly and cooperating with the first and second sets of alignment holes for selectively positioning the forearm support assembly relative to the shaft, wherein the adjustment means is aligned with one of the holes of the first set to enable the forearm support assembly to be rotated against the load from the initial downward position to an upward position in a first direction or aligned with one of the holes of the second set to enable the forearm support assembly to be rotated against the load from the initial upward position to a downward position in a second opposed direction.

4,988,099

MOVING CHARACTER ACTION GAME

Wayne A. Kuna, River Forest, and Ralph J. Kulesza, Chicago, both of Ill., assignors to Wayne Kuna & Associates, Oak Park, Ill.

Filed Jan. 16, 1990, Ser. No. 466,063

Int. Cl.[5] A63F *9/00*

U.S. Cl. 273—1 GF **19 Claims**

1. A game comprising in combination:

a hollow body adapted to be supported upon a playing surface;

means within the hollow body for effecting movement of the body relative to the playing surface;

an elongated member having opposed ends;

one of the ends of the elongated member being mounted to the body;

a receptacle having front and back ends;

an opening in the front end of the receptacle;

the back end of the receptacle being connected to the other end of the elongated member;

the elongated member being sufficiently rigid to support the receptacle spaced from the body while being sufficiently

flexible so that the receptacle moves asynchronously with respect to the body as a result of the movement of the body relative to the playing surface; and

items for depositing into the opening of the receptacle.

4,988,100

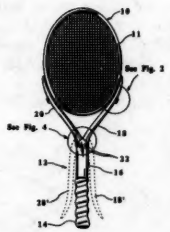
TENNIS RACKET WITH SEPARABLE HEAD AND HANDLE ASSEMBLY

Donald G. C. Shu, 215 Virginia Ave. #203, San Mateo, Calif. 94402; Norbert J. Stein, 3054 Harding Ave., Santa Clara, Calif. 95051, and Claude A. S. Hamrick, 19570 Montevina Rd., Los Gatos, Calif. 95030

Filed Apr. 3, 1989, Ser. No. 332,480

Int. Cl.[5] A63B *49/02, 49/08*

U.S. Cl. 273—73 C **15 Claims**



1. An improved tennis racket apparatus comprising:

a generally oval shaped racket head including a rigid rim for supporting a tensioned array of ball engaging strings;

a handle unit including a grip forming portion at one end and a shank forming portion at the other end;

yoke means including a pair of arms collapsibly associated with each other;

first fastening means for collapsibly securing one end of each of said arms to the distal end of said shank portion; and

second fastening means for releasably fastening the other end of each of said arms to said rim whereby, when assembled, a tennis racket of generally conventional configuration is provided, and when disassembled by releasing said second attachment means and collapsing said arms relative to each other and to said shank forming portion, said racket apparatus is separated into two component parts, each of which has a maximum dimension equal to less than one-half the length of the assembled racket unit.

4,988,101

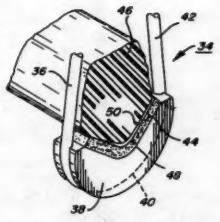
SHOCK ABSORBING STRING POST FOR SPORTS RACKETS

Tsai C. Soong, 1839 Jackson Rd., Penfield, N.Y. 14625

Filed Sep. 5, 1989, Ser. No. 402,549

Int. Cl.[5] A63B *51/10*

U.S. Cl. 273—73 D **8 Claims**



1. In a sports racket having a frame defined by a top section, two opposed side portions, a throat or shank section and a handle, the improvement comprising:

a string network having longitudinal strings and transverse cross strings wherein the axes of a portion of said longitudinal strings converge to a point within the handle,

a string seating member secured to the frame adjacent the throat section, said portion of longitudinal strings being arranged to extend from the top section of the frame to and around said seating member and back to the top section,

a damping member positioned on said string seating member between said seating member and said portion of longitudinal strings where said portion of strings extend around said seating member for damping vibration induced upon said portion of strings upon impact thereon by a sports racket.

4,988,102

WEIGHTED GOLF GRIP

Robert J. Reisner, Chicago, Ill., assignor to Para-Tech Industries, Inc., Denver, Colo.

Filed Nov. 9, 1989, Ser. No. 434,887

Int. Cl.[5] A63B *53/14*

U.S. Cl. 273—81 A **8 Claims**

1. A golf club comprising:

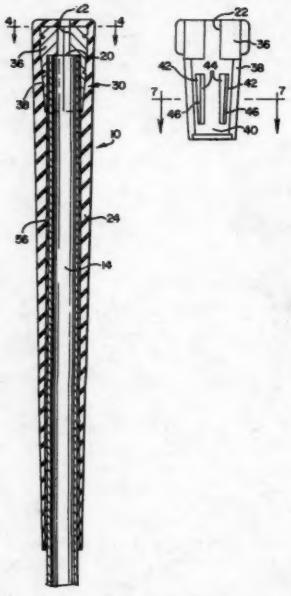
a cylindrical shaft, a club head on one end of said shaft and a grip portion on the distal end of said shaft opposite said club head;

said grip portion including a weight assembly on said distal end of said shaft;

said weight assembly being made of heavy, metallic material and including at least two longitudinal portions located

about said distal golf shaft end in spaced relationship, an upper segment of each said longitudinal portion having a part positioned entirely behind said shaft, the combined mass of said longitudinal portions being disposed equally about said shaft end;

said upper segments each having a flange depending therefrom, said flanges each having an inner surface configured for surrounding and contacting said shaft at said distal end and at least one generally vertically extending recess in each of said inner surfaces;



a layer of adhesive tape being disposed on said distal end of said shaft;

said weight assembly being encompassed by a resilient grip material; and

said recess configured for collecting portions of said tape therein, thereby maintaining the relative immobility of said weight assembly and preventing movement of said weight assembly and said grip portion relative to said shaft.

4,988,103

GEOMETRIC PUZZLE OF SPHERES

Ming S. Cheng, 1 Fl., No. 12, Alley 20, Lane 66, Tung Yuang St., Taipei, Taiwan

Filed Oct. 2, 1989, Ser. No. 415,962

Int. Cl.[5] A63F *9/12*

U.S. Cl. 273—157 R **3 Claims**

1. A puzzle of a fit-together type comprising:

seven ball blocks with two being identical to the rest, each said ball block being composed of five identical balls joined together in one of the following ways:

(a) a line of 4 balls with one ball placed adjacent to said line of 4 balls and in contact with two end balls in said line of 4 balls;

(b) a first line of 3 balls with a second line of 2 balls placed adjacent to and parallel to said first line of 3 balls with said second line of 2 balls having both balls contacting a central ball of said first line of 3 balls;

(c) a first line of 3 balls with a second line of 2 balls placed adjacent and parallel to said first line of 3 balls with said second line of 2 balls having both balls contacting an end ball of said first line of 3 balls;

(d) a line of 3 balls with one ball placed adjacent to said line of 3 balls so that said one ball contacts two balls of said line of 3 balls and an other ball is placed in contact with a remaining ball of said line of 3 balls on an opposite side of said line of 3 balls to said one ball and at an angle of 120 degrees away from said line of 3 balls;

(e) a V-shaped configuration of said five identical balls with an inside angle of 60 degrees; and,

said ball blocks being designed to be fittable together to selectably form a planar equilateral triangular figure constructed from thirty-five balls so that one angle position is left blank, a planar elongated hexagonal figure constructed from thirty balls so that one of said seven ball blocks is left unused, and a solid regular tetrahedral figure constructed from thirty-five balls.

4,988,104

GOLF CLUB HEAD AND PROCESS FOR ITS FABRICATION

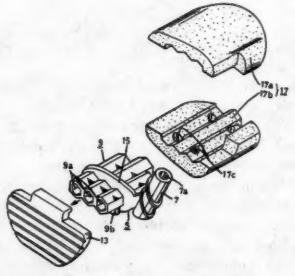
Tadahiko Shiotani, and I. Watanabe, both of Nagoya, Japan, assignors to Kunimori-Kagaku Co., Ltd., Japan

Filed Sep. 1, 1989, Ser. No. 401,972

Claims priority, application Japan, Apr. 3, 1989, 1-39513[U]; Apr. 24, 1989, 1-103636

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—167 H **11 Claims**



1. A club head for a golf club, comprising:

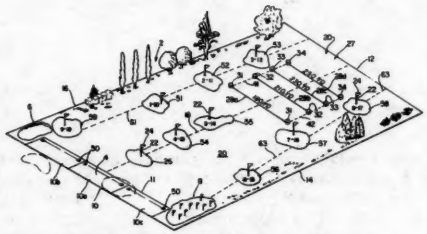
a body having a face side for striking a golf ball and an opposite back side;

a synthetic resin frame having a front side toward the face side of the club head and a rear side toward the back side of the club head;

a hollow axial member defined in the frame and extending from the front side toward the rear side of the frame;

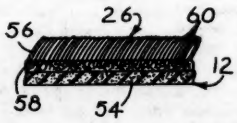
a hosel part on the frame for receiving a golf club shaft;
a foam material core covering the exterior of the hollow axial member; and
a synthetic resin coating around the outer periphery of the core, and defining an enclosure around the frame and the core.

4,988,105
METHOD AND COURSE FOR PLAYING A GOLF-LIKE GAME
Ralph Perry, 5731 Pine Acres La., Roanoke, Va. 24014, and Edgar N. Weaver, Jr., 2502 Stanley Ave., SE., Roanoke, Va. 24014
Division of Ser. No. 97,640, Sep. 16, 1987, Pat. No. 4,928,973. This application May 23, 1989, Ser. No. 357,016
Int. Cl.[5] A63B 67/02
U.S. Cl. 273—176 A 19 Claims



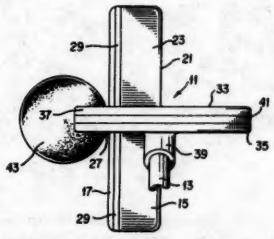
1. A playing field on which a golf-like target game is played, said field comprising:
an elongated course of predetermined length and width;
a plurality of teeing locations positioned next to each other at one end of said course and constituting teeing means;
a plurality of target greens positioned on said course each of said greens being a predetermined distance from said teeing means, each of said greens forming part of a hole to which a par value of 3, 4 or 5 has been assigned, said target greens for par 5 holes being located farther away from said teeing means than said target greens for par 4 holes;
at least one dedicated pitching green located at a predetermined distance from said teeing means, said pitching green being closer to said teeing means than either said target greens for par 4 holes and said target greens for par 5 holes; and
a plurality of uniquely colored yardage markers, each of said markers being positioned progressively at greater distances from said teeing means.

4,988,106
GOLFER'S PUTTING DEVICE
Ralph E. Coonrod, 8317 Spring Valley Rd., Belton, Mo. 64012
Continuation-in-part of Ser. No. 285,409, Dec. 16, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 472,850
Int. Cl.[5] A63B 67/02
U.S. Cl. 273—176 F 14 Claims



1. A practice putting green comprising:
a base of elongated material presenting a playing surface simulative of a golf green surface; and
structure defining at least one opening in said playing surface simulative of a golf green cup,
said base including
a backing,
an upstanding weave extending from said backing and composed of loops of continuous filament synthetic resin fiber presenting said playing surface, and
a scrim disposed between said backing and playing surface,
said weave and scrim cooperatively presenting means for providing a first resistance to the roll of a golf ball on said playing surface in a first direction and for providing a second, significantly different resistance to said roll in a second, opposed direction.

4,988,107
GOLF PUTER INCLUDING SIGHT BAR
Howard A. Sasse, 2101 Sandhills Blvd., Southern Pines, N.C. 28387
Filed Jan. 3, 1990, Ser. No. 460,390
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—183 D 6 Claims



1. A golf putter having a shaft member, a clubhead, and a sight bar, said putter comprising:
(a). a clubhead having a substantially flat front striking face, said clubhead having a top surface, said top surface having a substantially straight longitudinal front edge, an indicating means in the form of a straight line positioned contiguous to said front edge,
(b). a sight bar joined to and connecting said clubhead and said shaft member, said sight bar having a forward portion and a rear portion, said sight bar having an inclined top surface tapering downward from said rear portion to said front portion, the said forward portion of said sight bar positioned above said clubhead and extending forward of said striking face, said top surface of said sight bar having a primary aiming means thereon comprised of a straight line marking centrally positioned thereon,
(c). when viewed by a golfer in a putting stance, he sees a cross, the stem of the cross being said primary aiming means on said sight bar neck member and the lateral extensions of the cross being the said indicating means on said clubhead, and
(d). said arrangement facilitating an easy alignment by the golfer in a putting stance of the striking face of the clubhead with a ball and a target, and the maintenance of such alignment during the putting stroke, while simultaneously providing a means for a putting instructor positioned aside or behind the golfer to view the same alignment.

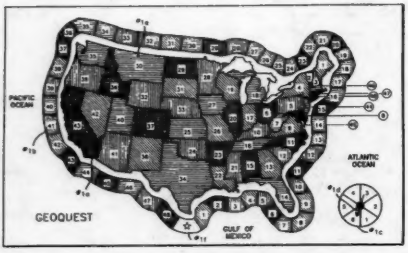
4,988,108
QUESTION AND ANSWER GEOGRAPHY BOARD GAME
Howard F. Shepard, 16707 Quai Park Dr., Missouri City, Tex. 77489
Filed Jul. 24, 1989, Ser. No. 385,393
Int. Cl.[5] A63F 3/04, 9/18
U.S. Cl. 273—254 2 Claims

1. A board game apparatus of competition between players designed to enhance the geographic knowledge of the players, comprising:

a board acting as a playing surface having a map of a geographic region which is divided into a plurality of separate and distinctive properties, each of the properties is one of a plurality of colors and is assigned a separate number thereto;

said board including a trail forming a closed loop around the map, the trail being divided into individual spaces with each space corresponding to a separate property by being the identical color and identical number as its corresponding property wherein each number assigned to a particular property appears only once on the trail, the trail having one space designated as the players starting space and the numbers on the trail appear in increasing numerical order beginning adjacent to the starting space and proceeding around the trail in a counterclockwise fashion;

a plurality of tokens constituting the playing pieces, each token representing a player's position on the trail of said board;



spinner means to determine the number of spaces to advance said token of the player along the trail during the player's turn;

a plurality of game cards having one specific game card for each colored and numbered space on the trail, the front face of said game card depicts the shape of the property and is colored and numbered the same as the property on the map on said board; the back face of said game card discloses the name of the property and its capital;

a plurality of capital cards wherein all the capital cards are identical to one another, each said capital card represents an award to a player earning said capital card; and

a plurality of geoquestion cards containing a question of geographic nature on the front face and the answer on the back face of said geoquestion card; whereby a player is entitled to a geoquestion card only after correctly identifying the property and capital represented by the space on which the player's token has landed.

4,988,109

QUICK-SET DOMINO ARRANGEMENTS INCLUDING TWO-PERSON DOMINO CHALLENGE GAME

Shuo-Yen R. Li, 820 Long Hill Rd., Gillette, N.J. 07933

Filed Jan. 12, 1989, Ser. No. 296,001

Int. Cl.[5] A63F *7/02*

U.S. Cl. 273—281 **6 Claims**

1. A toppling domino game device comprising

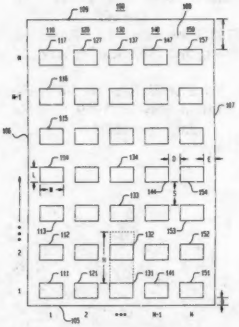
a game board,

an array of dominoes arranged in predetermined rows and columns on said board such that said dominoes are cooperatively juxtaposed as follows:

(a) each of said dominoes is rotatably mounted to the top surface of said board to effect rotational movement between an upright position substantially perpendicular to said surface and a basically prone position relative to said top surface;

(b) with said dominoes in said upright position, each column is configured so that when an arbitrary one of said dominoes in said column is set in motion by a player, all other dominoes in said each column in the direction of said rotational movement tumble sequentially to said prone position; and

(c) said array is further adapted to set said dominoes to said upright position by sequential movement of said board by the player from a horizontal orientation to a substantially vertical orientation and then back to said horizontal orientation,



wherein said board is a hexagonally-shaped, thin planar board, said array of dominoes is arranged in M rows (i=1, 2, . . . , M) and N columns (j=1, 2, . . . , N) such that the j=1 column has M dominoes, M odd, the j=2 column has M−2 dominoes, and so forth, and with said each column identified as the j^{th} column, and with said arbitrary one of said dominoes equated to the i^{th} domino, then all dominoes i+1, i+2, . . . , in said j^{th} column tumble to said prone position.

4,988,110

COMBINATION BOARD GAME AND WRAPPER FOR EDIBLE PLAY PIECES

Ronald K. Zuckerman, Minnetonka, and Gregory J. McAfee, Eagan, both of Minn., assignors to Grist Mill Company, Lakeville, Minn.

Filed Dec. 20, 1989, Ser. No. 453,844

Int. Cl.[5] A63F *3/00, 3/02;* B65D *65/46*

U.S. Cl. 273—286 **33 Claims**

1. A combination wrapper and board game for containing a plurality of edible pieces for use with the board game, said combination comprising:

a sealed wrapper body formed from a sheet of wrapping material having an inner surface and an outer surface;

board game indicia printed on the outer surface of said wrapping material so that said wrapper body is deployable as a flat sheet for converting said wrapper body into a board game; and

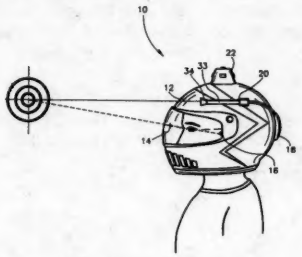
means defining play pieces sealed within said wrapper body in contact with said inner surface for use in combination with said board game indicia.

4,988,111

NON HAND-HELD TOY

Yonatan Gerlizt, 23 Malchei Israel Street, Herzliya; Dan Moran, 19 Aluf David Street, Ramat Chen, Ramat Gan, and Roni Raviv, 9a/8 Maccabi Street, Ness Ziona, all of Israel

Filed Dec. 11, 1989, Ser. No. 447,124
Claims priority, application Israel, Dec. 12, 1988, 88661
Int. Cl.[5] F41J 5/08
U.S. Cl. 273—310 15 Claims



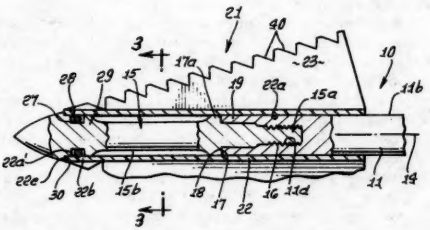
14. A non hand-held toy comprising:
means for visual aiming on a target; and
means for radiation communication between the target and a given location on the toy and wherein said means for radiation communication is voice activated.

4,988,112

ARROW SLIDABLE BLADE UNIT

Robert L. Anderson, 841 Frankfort, Huntington Beach, Calif. 92648, and Thomas E. Cacek, 3309 Arbor Rd., Lakewood, Calif. 90712

Filed Feb. 5, 1990, Ser. No. 475,197
Int. Cl.[5] F42B 6/08
U.S. Cl. 273—420 8 Claims



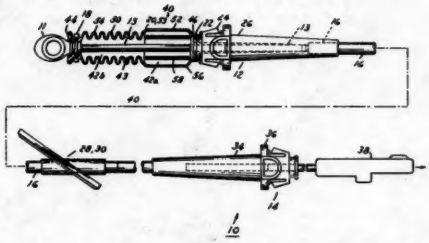
1. For use on an arrow having an axially elongated shaft including a mandrel at the forward end of the shaft, and in combination with said mandrel, a blade unit, comprising
(a) a generally axially extending tubular body, and blades on and projecting outwardly from the body, the body being telescopically slidable on the shaft, and on the mandrel,
(b) and means on the mandrel to releasably axially retain the body to the mandrel during airborne flight of the arrow, and to release the body for axial rearward sliding on the shaft in response to penetration of the mandrel into a target, said means comprising a forward flange defining an annular recess, and an O-ring in the recess and frictionally engaging a bore defined by the body,
(c) the mandrel having a rearward flange supporting said bore, and the mandrel having an axially elongated peripheral annular recess defined between said flanges to eliminate frictional contact of the mandrel with said bore, between said flanges.

4,988,113

SEALED PROTECTIVE BOOT FOR MOVABLE SHAFTS

Adam W. Chaczyk, Sterling Heights, Mich., assignor to Babcock Industries, Inc., Fairfield, Conn.

Filed Feb. 28, 1990, Ser. No. 486,526
Int. Cl.[5] F16J 15/50
U.S. Cl. 277—212 FB 18 Claims



1. A protective boot constructed and arranged for providing a sealed chamber around a reciprocating shaft, which extends from a neutral position and retracts from a neutral position, comprising:
a body of material that is capable of flexing,
said body comprising a longitudinally extendible and contractible first section, adapted to have one end sealed to a reciprocating shaft, said first section comprising a plurality of circumferential pleats constructed and arranged to be spaced apart from a neutral position to achieve longitudinal extension with said shaft and then to be spaced closer together from a neutral position during retraction of said shaft;
said body comprising an integral second section adapted to be sealed to a housing which encompasses said shaft,
said second section being constructed and arranged to be fixed in the longitudinal direction;
said second section comprising a plurality of circumferentially spaced portions extending axially from the center of said second section on its, circumference, and some of said portions being outwardly concave with respect to the longitudinal axis and some of said portions extending axially and being with respect to the longitudinal axis inwardly concave in the neutral position, connected by relatively thicker outwardly curved portions; and
said inwardly concave portions constructed and arranged to flex radially outward from a neutral position at a predetermined high pressure and said outwardly concave portions constructed and arranged to flex inwardly from a neutral position at a predetermined low pressure.

4,988,114

REMOTELY OPERATED WHEELCHAIR FOOTREST MOVING DEVICE

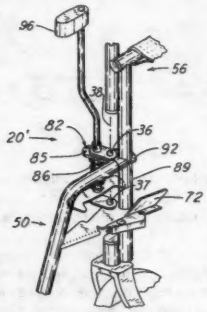
Harold C. Thornton, Jr., 131 Athens Rd.; Joseph W. Miller, 129 Newport Rd., both of Oak Ridge,, Tenn. 37830; Bruce E. Wilson, Rte. 3, Box 1496, Lakeawana, Loudon, Tenn. 37774, and James D. Wolfenbarger, 8112 Hill Rd., Knoxville, Tenn. 37983

Filed Nov. 28, 1989, Ser. No. 442,009
Int. Cl.[5] B62M 1/14
U.S. Cl. 280—304.1 14 Claims

1. A device for remotely operating a wheelchair footrest means that is pivotally supported on a pair of spaced-apart, upwardly-directed, and vertically-aligned attachment posts on a forward leg of a wheelchair so as to be moveable from a position in front of said wheelchair to a position at the side of said wheelchair, said footrest means provided with a latching means including a latch release means for releasably latching said footrest means in said position in front of said wheelchair, said device comprising:

bracket means having substantially parallel supporting structures at opposite ends of said bracket means, said supporting structures spaced apart a distance corresponding to a spacing between said attachment posts on said wheelchair, said supporting structures each provided with a hole for engagement with one of said attachment posts whereby said bracket means is permitted to rotate about an axis established by said aligned attachment posts;

operator means having a first end connected to said bracket means and a distal end proximate an armrest of said wheelchair, said operator means providing for rotation of said bracket means about said axis; and



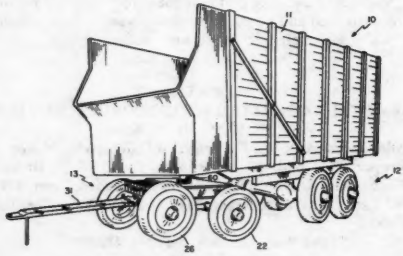
an elongated cam member attached to said bracket means for rotation therewith, said cam member being oriented substantially perpendicular to said axis, said cam member having an edge cam surface extending a distance from said bracket means whereby said edge cam surface contacts and operates said latch release means of said footrest means when said bracket means is rotated by said operator means in one direction to thereby unlatch said footrest means and rotate said footrest means to said side of said wheelchair.

4,988,115

UNDERCARRIAGES

Charles W. Steinke, R.R. 2, Box 194, Fairfax, Minn. 55332

Filed Jul. 31, 1989, Ser. No. 386,910
Int. Cl.[5] B62D *13/02*
U.S. Cl. 280—404 **11 Claims**



1. A trailer for towing by a vehicle comprising:

a rear wheeled undercarriage for supporting a rear of the trailer;

a front wheeled undercarriage for pivotably and rockably supporting a box on the trailer, said front undercarriage including a platform bolster, said platform bolster pivotally connected to the box on the trailer, a set of front wheels on said front undercarriage, a set of rear wheels on said front undercarriage, said front wheels having a front bolster extending therebetween to vertically support said platform bolster, said rear wheels having a rear bolster extending therebetween to vertically support said platform bolster, and tie rods connected to said front wheels to permit a user to turn the front wheels of said front undercarriage independent of the rear wheels of said front undercarriage so that the front undercarriage provides steerable pivotal support to the box on the trailer to thereby minimize the stress on the box induced by the undercarriage passing over uneven terrain; and

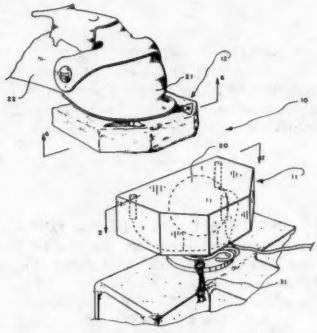
said platform bolster includes a recess and said rear bolster includes a member attached to said rear bolster and positioned in said recess to prevent lateral displacement of said platform bolster with respect to said rear bolster.

4,988,116

TRAILER HITCHING AID

Gary L. Evertsen, 4627 Porter Ave., Ogden, Utah 84403

Filed Apr. 10, 1989, Ser. No. 335,856
Int. Cl.[5] B60D *1/36*
U.S. Cl. 280—477 **3 Claims**



1. A towing vehicle positioning aid for joining a vehicle mounted hitching ball to a trailer mounted ball accepting socket, the positioning aid comprising:

switching means including a set of three magnetically actuated normally open switches spaced apart about the ball in a triangular pattern, the rearmost side thereof being lateral to the vehicle and rear of the ball; and

a set of three permanent bar magnets generating a permanent magnetic field having a pair of side segments disposed on each side of the socket parallel to the trailer longitudinal axis and a segment perpendicular to said axis connecting the pair of ends of the side segments which are forward of the socket, so that the closing of only one or two of the switches corresponds to the direction of deviation of the position of the ball from the socket; and

means indicating to the vehicle operator the open or closed condition of each of the switches as the vehicle is maneuvered into trial hitching positions.

4,988,117

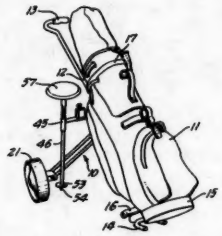
RETRACTABLE SEAT ATTACHMENT FOR FOLDABLE CADDY CART

John F. Shortall, Dulin, Ireland, assignor to Designcraft International Ltd., Dublin, Ireland

Filed Sep. 20, 1989, Ser. No. 410,110
Int. Cl.[5] B62B *1/10*
U.S. Cl. 280—646 **7 Claims**

1. A seat attachment for a caddy cart or the like of the type having a pair of spaced-apart wheels, an inclined frame member supported by said wheels and having a portion rearward of said wheels engageable with the ground when the cart is stationary and a portion forward of said wheels engageable by the user to pull the cart forward, which comprises,

(a) a mounting member extending laterally outward from said frame member in a location behind the axis of said wheels when said cart is in a resting position,
(b) a generally vertically disposed support member carried at the outer end of said mounting member and movable vertically with respect to said frame member,
(c) resilient means normally urging said support member upwardly whereby its lower end is positioned slightly above the surface upon which said cart is resting,
(d) a seat pad supported by said vertical support member,
(e) said vertically disposed support member being movable



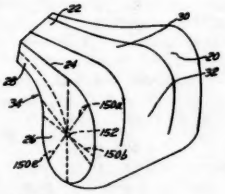
relative to said cart and into supported contact with said surface when the weight of a person is supported on said seat pad,
(f) said mounting means including means for retracting said vertical support member to a position close to and generally in alignment with said frame member.
(g) said mounting means comprising means accommodating controlled displacement of said guide member toward said frame member and controlled rotational re-orientation of said guide member into general alignment with said frame member to enable retraction of said vertical support member.

4,988,118

AIR BAG AND METHOD OF FABRICATING SAME

Stanley B. Good, Richmond; John A. La Fond, Sterling Heights; Michael J. Lachat, Mt. Clemens, and Dinesh B. Shah, Troy, all of Mich., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Feb. 5, 1990, Ser. No. 475,067
Int. Cl.[5] B60R *21/20*
U.S. Cl. 280—743 **19 Claims**



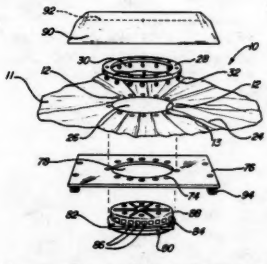
1. An air bag (50) comprising:
a piece of material (52) suitable for use as an air bag or cushion defining a main panel; the main panel (20) including:
first (60,102*a*) and second opposingly situated ends (62, 102*b*) and first (66) and second (68) opposingly situated sides;
the first side (66) including a plurality of first triangular-like shapes (70) and first (100*a*) and second (100*b*) transition edges extending from the certain ones of the first triangular-like shapes to the first and second ends respectively;
the second side (66) including a plurality of second triangular-like shapes (72) and third (100*c*) and fourth (100*d*) transition edges extending from the certain ones of the second triangular-like shapes to the first and second ends respectively;
wherein adjacent edges of the plurality of first triangular-like shapes are joined together, adjacent edges of the plurality of second triangular-like shapes are joined together to form a configuration wherein the first and second and third and fourth transition edges are in relative opposition to one another and wherein the first and second and third and fourth transition edges are respectively joined together.

4,988,119

VEHICLE OCCUPANT RESTRAINT SYSTEM

James Hartmeyer, St. Clair Shores, Mich., assignor to Irvin Automotive Products, Inc., Auburn Hills, Mich.

Continuation-in-part of Ser. No. 257,971, Oct. 14, 1988, abandoned. This application Aug. 11, 1989, Ser. No. 392,642
Int. Cl.[5] B60R *21/16*
U.S. Cl. 280—743 **64 Claims**



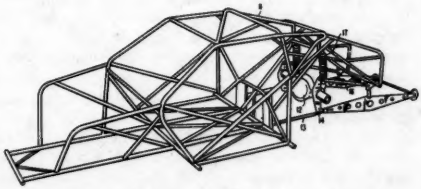
1. An air bag passenger safety device for use in a motor vehicle having an air bag inflating apparatus comprising:
a single continuous piece of fabric material which is foldable, resists permeability of gases, and defines a perimeter edge,
gathering means for gathering and supporting substantially all of said fabric perimeter edge to define an opening which is smaller in its cross-dimension than a cross-dimension of said blank before gathering thereby defining a plurality of pleats of said fabric, and
mounting means for securing said air bag assembly to said vehicle such that said air bag opening is in communication with said inflating apparatus.

4,988,120

CHASSIS SYSTEM FOR RACE VEHICLE WITH WHEELIE BARS

Anthony V. Jones, R.R. 5, Box 317, North Vernon, Ind. 47265

Filed Sep. 20, 1989, Ser. No. 409,739
Int. Cl.[5] B60R *21/13*; B60S *9/02*
U.S. Cl. 280—755 **16 Claims**



1. A vehicle chassis system comprising in combination:
an axle bracket including means for receiving an axle,
a frame structure including means for accommodating a rear wheel, said frame structure extending forward of the rear wheel accommodating means and rearward of the rear wheel accommodating means,

a wheelie bar having forward and rear ends and connected to the axle bracket and extending rearwardly therefrom,

a first connecting member connected to the axle bracket below the center of the axle receiving means of the axle bracket and connected to the portion of the frame structure that extends forward of the rear wheel,

a second connecting member connected to the axle bracket above the center of the axle receiving means of the axle bracket and connected to the portion of the frame structure that extends rearward of the rear wheel, and

a third connecting member connecting the rear portion of the frame structure to the wheelie bar, at a location between the forward and rear ends of the wheelie bar.

4,988,121

SEAT BELT DEVICE FOR OPEN-TOP VEHICLE

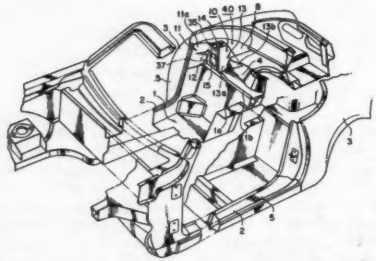
Noboru Yoshii, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 28, 1989, Ser. No. 386,368

Claims priority, application Japan, Jul. 30, 1988, 63-191728

Int. Cl.[5] B60J *7/12*; B60R *22/24*

U.S. Cl. 280—808 **12 Claims**



1. A seat belt device for an open-top vehicle comprising:

belt means for fastening a passenger onto a seat,

support means mounted on a rear body portion of the vehicle at a position rearward of the seat for carrying the belt means,

extension means extending rearwardly from the support means and fixed to the rear body portion,

a rear fender panel provided on said rear body portion and extending longitudinally and defining a rear end of a door opening of the vehicle to constitute a rear outer side surface of the vehicle,

a first plate member,

a side panel connected with the rear fender panel at an outer portion and with said first plate member at an inner portion to constitute a storage portion for a foldable roof structure of the vehicle, the first plate member being connected with the side panel, the first plate member being formed with a side wall portion constituting an outer side wall of the support means and with a rear wall portion extending inwardly from a rear end of the side wall portion to constitute a rear wall of the support means, the support means being provided with a second plate member connected with the side wall portion of the first plate member at an outer end to constitute a front wall of the support means, and

a third plate member connected with inner ends of both the second plate member and the rear wall portion of the first plate member to form an inner wall and the extension means extending rearwardly from the support means.

4,988,122

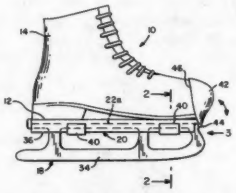
ROLL ICE SHOE

Adah W. Saunders, 41-10 Bowne St., Apt. 7-V, Flushing, N.Y. 11355

Filed Jan. 31, 1990, Ser. No. 472,969

Int. Cl.[5] A63C *1/00*

U.S. Cl. 280—841 **3 Claims**



1. A combination roller skate and ice skate comprising:

(a) an elongated base member;

(b) a boot affixed to a top of said elongated base member;

(c) a roller skate insert; wherein said roller skate insert includes:

(i) an elongated plate having a plurality of spaced apart notches on each long side thereof; and

(ii) a pair of wheel assemblies, one of said wheel assemblies extending downwardly from front of said plate while other of said wheel assemblies extending downwardly from rear of said plate.

(d) an ice skate insert; wherein said ice skate insert includes:

(i) an elongated plate having a plurality of spaced apart notches on each long side thereof; and

(ii) a blade extending downwardly from center of said plate

(e) means for removably attaching said roller skate insert to the bottom of said base member so that a person wearing said boot can roller skate, and for removably attaching said ice skate insert to bottom of said base member so that the person wearing said boot can ice skate; wherein said means for removably attaching includes:

(i) a pair of tracks, each said track formed on an underside of said elongated bare member along one long side thereof and having a plurality of spaced apart transverse slots extending therein; and

(ii) a plurality of L-shaped tongues insertable into said slots so that in one instance said elongated plate of said roller skate insert can be inserted between said tracks with said notches in alignment with said slots enabling said v-shaped tongues to enter said notches to lock said roller skate insert thereto and in another instance said elongated plate of said ice skate insert can be inserted between said tracks with said notches in alignment with said slots enabling said v-shaped tongues to enter said notches to lock said ice skate insert thereto.

4,988,123

ERASABLE SYSTEM INCLUDING MARKING SURFACE AND ERASABLE INK COMPOSITION

Nan J. Lin, Burlington, and Peter G. Hanley, Milford, both of Mass., assignors to The Gillette Company, Boston, Mass.

Continuation of Ser. No. 906,866, Sep. 15, 1986, abandoned. This application Dec. 19, 1988, Ser. No. 287,507

Int. Cl.[5] B42D *1/00*; B32B *3/00*; C09D *11/00*

U.S. Cl. 281—15.1 **18 Claims**

1. An erasable system comprising a marking element and an erasable marking composition for applying markings to the marking element, said marking element comprising a plurality of superposed sheets bound in the form of a book, each sheet having a substantially non-porous marking surface, said marking composition consisting essentially of a dispersion of an elastomeric film-forming polymeric material selected from the group consisting of natural rubbers, synthetic elastomers essen-

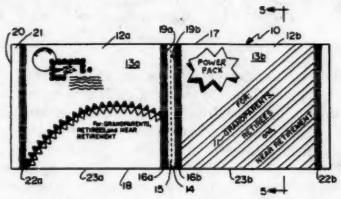
tially duplicating the structure of natural rubbers, styrene-containing block copolymers and mixtures of these and a colorant in an organic solvent system, said marking composition providing an erasable, coalesced residue on drying which is substantially water insoluble and which is erasable by an elastomeric eraser.

4,988,124

PACKAGING BAG INSERT FOR FOLDED PUBLICATIONS

Michael L. Hudetz, Plano, Ill., assignor to Solar Press, Inc., Naperville, Ill.

Filed Oct. 16, 1989, Ser. No. 422,094
Int. Cl.[5] G09F *3/00*
U.S. Cl. 283—56 **3 Claims**



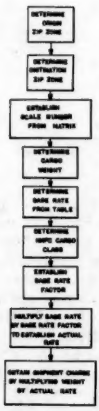
1. A publication containing a packaging bag comprising (a) a plurality of pages folded and collated to form a multi-page publication having a central fold, and (b) a packaging bag which includes a plurality of sealed envelopes containing one or more inserts and being attached to each other along at least one margin of said envelopes, at least two of said envelopes being separated by a fastening area, said packaging bag being inserted between pages of said publication such that said fastening area overlaps said central fold and at least two of said envelopes are on opposite sides of said fold.

4,988,125

TARIFF RATING SYSTEM

George W. Calhoun, Clinton, Ohio, assignor to Roadway Express, Inc., Akron, Ohio

Continuation of Ser. No. 558,315, Dec. 5, 1983, abandoned. This application Dec. 4, 1986, Ser. No. 937,442
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—67 **5 Claims**



1. A method for determining charges for shipping cargo interstate, comprising the steps of:

generating a chart containing a matrix of source and destination zones, said matrix pairing said source and destination zones;

attributing a scale number to each pair of source and destination zones within said matrix, said scale numbers being derived from an average of shipment distances between the associated pair of source and destination zones;

attributing a base rate number to each scale number;

establishing a rate factor number according to the nature of the cargo; and

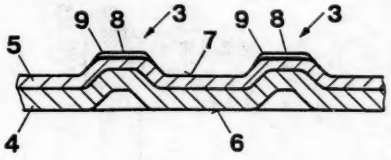
determining an actual rate for shipping the cargo from one of said source zones to one of said destination zones by multiplying an associated base rate number by said rate factor number.

4,988,126

DOCUMENT WITH AN UNFORGEABLE SURFACE

Christoph Heckenkamp; Gerhard Stenzel, both of Munich, and Wittich Kaule, Emmering, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft fur Automation und Organisation mbH, Munich, Fed. Rep. of Germany

Filed Nov. 25, 1988, Ser. No. 276,198
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741179
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—92 **23 Claims**



1. In a document with a surface relief having raised zones in relation to the main surface of the document;

said zone being local deformations of the document itself;

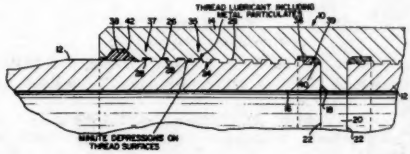
wherein the improvement comprises at least one luminescent coating material being at least partially present only on the raised zones of the relief.

4,988,127

THREADED TUBING AND CASING JOINT

Kenneth J. Cartensen, 4540 N. 44th St., No. 70, Phoenix, Ariz. 85018

Continuation of Ser. No. 726,605, Apr. 24, 1985, abandoned. This application Dec. 29, 1988, Ser. No. 290,843
Int. Cl.[5] F16L *15/04*
U.S. Cl. 285—94 **25 Claims**



1. A thread combination for joining a fluid hydrocarbon products casing or tubing having a nose end to a fluid hydrocarbon products collar, wherein the casing or tubing and collar each comprises:

a plurality of male threads on said fluid hydrocarbon products casing or tubing and a plurality of female threads on said fluid hydrocarbon products collar, said male and female threads selected to be threadedly engageable, said male and female threads further selected to be threads having a thread density of about five threads per inch;

said male and female threads having a substantially rectan-

gular thread profile having nominal root to crest dimension of substantially less than 0.060" and a taper of substantially less than 0.0625" per inch;

said male and female threads being dimensioned to have substantially zero clearance between a number of mating threads for a predetermined length from the nose end of each different tubing or casing;

wherein the tubing or casing has a nose end terminating in a flat face perpendicular to the longitudinal axis thereof; and

wherein the collar includes central ring means having reference faces perpendicular to the central axis thereof, each reference face being in face-to-face engagement with the nose end of a different tubing or casing.

4,988,128

COUPLING FOR A SHAFT HAVING A REINFORCEMENT FRAMEWORK

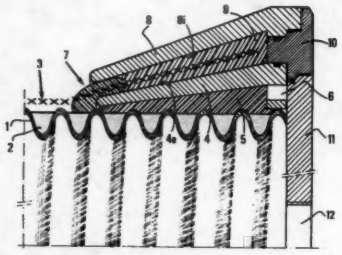
Anh T. Do, La Celle Saint Cloud, and Michel Huvey, Bougival, both of France, assignors to Institut Francais du Petrole, Rueil Malmaison, France

Filed Oct. 5, 1987, Ser. No. 104,256

Claims priority, application France, Oct. 7, 1986, 86 14040

Int. Cl.[5] F16L *39/00*

U.S. Cl. 285—149 **9 Claims**



1. In a coupling for a shaft comprising:

an axially extending shaft having reinforcement means extended there along and coupling means at one end thereof; a sheath of braided threads, resisting tractive forces at least extending along said shaft and radially spaced from said reinforcement means and terminating adjacent said one end; said coupling including an elastomeric cushion at said one end thereof in which said threads are embedded; said coupling means anchoring said elastomeric cushion and the ends of said threads to said shaft end, and wherein said elastomeric cushion has a longitudinal modulus of elasticity (Young's modulus) between 2 MPs and 200 MPa.

4,988,129

FLUID PIPE COUPLING

Noboru Saito; Haruo Kubo; Naoyuki Kotake, and Makoto Nagumo, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed Nov. 22, 1988, Ser. No. 274,958

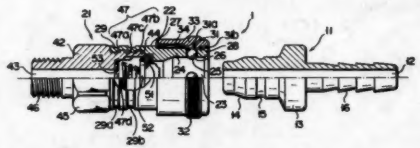
Claims priority, application Japan, Nov. 25, 1987, 62-179175[U]

Int. Cl.[5] F16L *25/00*

U.S. Cl. 285—328 **1 Claim**

1. A fluid pipe coupling which comprises a plug having a fluid passage hole, and a socket having a fluid passage hole and a retention mechanism for connection with or disconnection from the plug; wherein at least one of the plug and the socket includes a metal body member having a first cylindrical crimpable end section and a second end section adapted to engage with the other of the plug and the socket; a metal adapter member having a first connector end portion adapted to be connected with a pipe member and a second cylindrical grooved end section; and a seal member disposed between the body member and the adapter member;

the second cylindrical grooved end section having at least a pair of annular grooves and an annular projection formed between said pair of annular grooves, for holding said first cylindrical crimpable end section on an outer peripheral surface of said second cylindrical grooved end section, the annular projection having on its entire peripheral surface a plurality of straight grooves extending in an axial direction of the fluid pipe coupling;



first and second seat surfaces for the seal member formed on the body member and the adapter member, respectively;

wherein the first cylindrical crimpable end section is adapted to be deformed into crimped engagement with the second cylindrical grooved end section so that the body member and the adapter member are integrally coupled, said plurality of straight grooves preventing relative rotation between said body member and said adapter member, and wherein the seal member is sealingly clamped between the seat surfaces without twisting.

4,988,130

METAL SEAL FLANGE ASSEMBLY

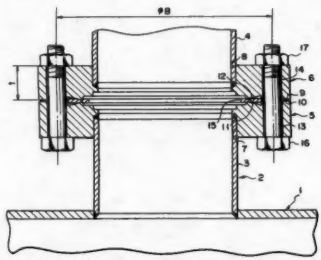
Kenjiro Obara; Kazuyuki Nakamura, both of Ibaraki; Yoshio Murakami, Mito; Masamitsu Naganuma, Yokohama; Kazunori Kitamura, Yokohama, and Takao Uchida, Yokohama, all of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Filed Jul. 13, 1989, Ser. No. 379,264

Claims priority, application Japan, Jul. 19, 1988, 63-178171

Int. Cl.[5] F16L *25/00*

U.S. Cl. 285—328 **5 Claims**



1. A metal seal flange assembly comprising:

a pair of steel plates individually having a pair of opposite surfaces facing each other, at least one of said plates having a hole defining a space to be sealed, said plates individually having a pair of ring-shaped knife edges formed on the opposite surfaces outside the hole, with respect to the radial direction thereof, so as to face each other, said knife edges defining an included edge angle of 70° to 100° ;

a ring-shaped copper gasket interposed between the pair of knife edges; and

a plurality of bolts penetrating the pair of opposite surfaces and arranged along a ring-shaped line, said bolts being adapted to fix the pair of plates to each other when tightened, so that the pair of knife edges bite into the copper gasket, and a circumferentially uniform linear sealing load

from the knife edges bears on the gasket, thereby sealing and isolating the space inside the hole from the outside, wherein the number n of bolts are given by

$$3(B+28)/65-0 \leqq n < 3(B+28)/65+0.02B,$$

and the thickness t of each said plate is given by

$$\sqrt{1.7B} - 0.01B \leqq t \leqq \sqrt{1.7B} + 0.02B,$$

where B is the diameter of a circle passing through the respective central axes of the n number of bolts.

4,988,131

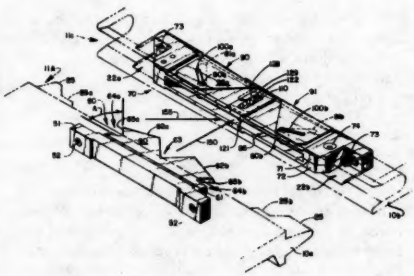
INTERLOCKING SECTIONS FOR PORTABLE FLOORS AND THE LIKE

Kermit H. Wilson, Edina, and Warren Skistad, Madison Lake, both of Minn., assignors to Sico Incorporated, Minneapolis, Minn.

Continuation of Ser. No. 443,809, Nov. 29, 1989, abandoned, which is a continuation of Ser. No. 216,818, Jul. 8, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 517,460

Int. Cl.[5] E04C *1/16*

U.S. Cl. 292—34 **2 Claims**



1. A locking mechanism, comprising: first and second lock members configured for fitting together when engaged for locking purposes;

said second lock member having parallel pins mounted therein for motion along defined paths of motion between first and second positions said paths of motion being in a plane transverse to the axes of the pins;

means for normally urging said pins to their first position;

said first lock member having means for moving said pins to their second positions when said first lock member is brought into engagement with said second lock member, said first lock member configured to permit said pins to return to their first positions after engagement of said first and second lock members;

said first lock member having engagement surfaces for engaging said pins upon attempted withdrawal of said first lock member from engagement with said second lock member, the relative shape of said engagement surfaces and the paths of motion of said pins configured to cause substantial interference preventing movement of said pins to their second positions and disengagement of said locking mechanism; and

means selectively operable to move said pins to their second positions to thereby permit disengagement of said mechanism.

4,988,132

DOORLATCH, IN PARTICULAR FOR WASHING MACHINES

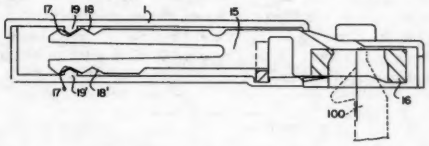
Onofrio Rocchitelli, Via per Lainate, 31- I 20010 Pogliano Milanese, Italy

PCT No. PCT/EP88/00013, § 371 Date Jul. 7, 1989, § 102(e) Date Jul. 7, 1989, PCT Pub. No. WO88/05476, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 6, 1988, Ser. No. 381,679

Int. Cl.[5] E05C *13/10*

U.S. Cl. 292—144 **4 Claims**



1. For use in effecting rapid locking and delayed unlocking of door-closing mechanisms of machines such as washing machines which have internal parts subject to inertial rotation;

apparatus of the type comprising a sliding bar (15) engageable with hook means (100) of the door latch and including locking pin means (21) suitable for locking said sliding bar (15) during the rotational part of the machine cycle, said locking pin means (21) being actuatable by the mobile contact means (8) of a microswitch functioning as a power switch for the machine, said mobile contact means of the microswitch being shiftable by means driven by a single bimetallic strip (2) suitably heated by a P.C.T. resistance electrically connected to the power circuit of the machine;

the improvement to said apparatus comprising:

a rocker arm (6) interposed between said bimetallic strip (2) and the mobile contact means (8) of said microswitch;

means (12) engaging said mobile contact means (8) of said microswitch for increasing or decreasing the load thereon to adjust the time required for curvature and straightening movement of said bimetallic strip during its heating and cooling stages;

supports (3 and 4) for said bimetallic strip (2);

said heating resistance being in contact with said bimetallic strip to be moved thereby; and

said rocker arm (6) being in contact with said resistance;

whereby the curvature and straightening times of said bimetallic strip remain constant over time.

4,988,133

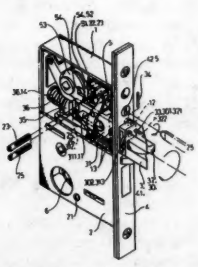
LOCK STRUCTURE WITH DIRECTION-CHANGEABLE DEVICE

Nan C. Shih, 116, Changtsao Rd., Changhua, Taiwan 500

Filed Dec. 2, 1988, Ser. No. 278,777

Int. Cl.[5] E05C *1/16*

U.S. Cl. 292—191 **2 Claims**



1. A direction-changeable lock structure, comprising a latch

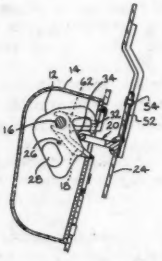
case having a faceplate and side walls, a sliding latch and a latch bolt provided with a notch or recess therein for pivotally fixing a cam-type bolt therein by means of a positioning pin and a pin hole and a disc located at a rear end of the latch bolt and engaging in a groove of the latch and capable of revolving movement therein, said cam-type bolt having a protrusion with a pin hole therein for a positioning pin to be inserted therethrough as well as through a selected set of a pair of opposing sets of ears with holes therein, said sets being provided on opposite sides of the case respectively, the latch further having a removable transverse pin extending through a movement-limiting slot in one side wall of the case whereby removal of the transverse pin allows increased sliding movement of the latch for projecting the latch bolt through an aperture in the faceplate to allow revolving movement of the latch bolt so as to change its direction.

4,988,134

INERTIA LATCHING MECHANISM WITH FLOATING STRIKER BAR

Mohan P. Vidwans, Saline; Susan H. Parkinson, Novi; Glenn Scott, Ann Arbor, and Anthony J. Fecteau, Roseville, all of Mich., assignors to Hoover Universal, Inc., Plymouth, Mich.

Filed May 3, 1990, Ser. No. 518,482
Int. Cl.[5] E05C *1/10*
U.S. Cl. 292—198 **16 Claims**



1. An inertia sensitive latch mechanism for latching first and second bodies together, said second body being movable relative to the first body and having a position latched to said first body, comprising:

a striker bar carried by said first body;

a pendulum affixed to said second body and having a pivot means for enabling rotation of said pendulum, said pendulum having its center of gravity located at a predetermined position below said pivot means and defining a notch and tooth for engaging said bar, when the second body is in the latched position, said pendulum tooth being aligned with said striker bar in the direction of motion of said tooth relative to said striker bar so as to capture said striker bar, said pendulum interacting with said bar such that when the second body is not moved from said latched position when the second body is not exposed to deceleration loads, said pendulum tooth is rotated out of alignment with said bar, and when the second body is exposed to predetermined deceleration loads, said pendulum tooth remains aligned with said bar and engages said bar to prevent movement of the second body relative to the first body;

means mounting said bar to said first body for movement relative to said first body; and

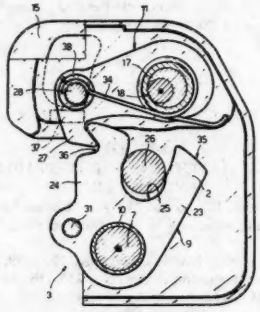
means for guiding movement of said bar relative to said first body to a predetermined position relative to said pivot means as said second body is moved relative to said first body to said latched position.

4,988,135

LOAD-INCREASABLE ELECTRICALLY OPERATED LOCK, PARTICULARLY FOR AUTOMOTIVE APPLICATION

Franco G. Ottino, San Giuliano Terme, Italy, assignor to Roltra Morse S.p.A., Cascine Vica-Rivoli, Italy

Filed Feb. 2, 1990, Ser. No. 474,275
Claims priority, application Italy, Feb. 3, 1989, 67062 A/89
Int. Cl.[5] E05C *3/26*
U.S. Cl. 292—201 **17 Claims**



1. An electrically operated lock for the door of a motor vehicle having peripheral elastic sealing means designed to cooperate in sealing manner with said door, said lock comprising:

a latch pivoting on a pin integral with said door, and designed to move between a first open position and a second closed position wherein it engages a respective striker on a fixed portion of said vehicle:

a retainer designed to cooperate with and maintain said latch in said closed position by virtue of elastic means;

means for mechanically activating said retainer;

electric activating means; and

means for controlling said electric activating means; characterised by the fact that it comprises control means **(86, 18)** activated by said electric activating means **(84)** and secured to said retainer **(11)**; said control means **(86, 18)** being designed to provide for reversible movement of said retainer **(11)** for further rotating said latch **(9)** from said second closed position to a third closed position wherein the load on said peripheral sealing means is increased.

4,988,136

RETRACTABLE DOOR HANDLE MOTION TRANSFER MECHANISM

Charles A. Gressett, Jr., Eagle Rock, Calif., assignor to Adams Rite Manufacturing Company, Industry, Calif.

Continuation-in-part of Ser. No. 286,178, Dec. 19, 1988, Pat. No. 4,915,432. This application Jul. 20, 1989, Ser. No. 382,414
Int. Cl.[5] E05C *21/02*
U.S. Cl. 292—336.3 **17 Claims**

1. In apparatus for transferring door opening or closing motion in response to displacement of a door handle, the combination comprising

(a) a mounting means,

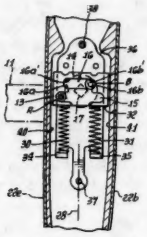
(b) the door handle carried by the mounting means for push or pull displacement toward or away from the mounting means,

(c) a rotary output element carried by the mounting means,

(d) and motion transfer elements co-operable between the handle and said output element to effect rotation of the output element in response to said displacement of the door handle,

(e) said motion transfer elements include first, second and third elements carried by the mounting means, for move-

ment relative thereto, the first and third elements coupled to the second element, the second element carried by the mounting means for bodily movement in response to



displacement of the first element by the door handle, the third element being rotatably in response to bodily movement of the second element, said rotary output element connected to the third element.

4,988,137

VEHICLE BUMPER ASSEMBLY WITH FOAMED CORE

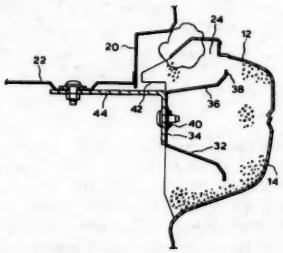
Stephen D. Fleming, 52 Lower Lambricks, Rayleigh, United Kingdom

Filed Apr. 30, 1986, Ser. No. 858,486

Claims priority, application United Kingdom, May 2, 1985, 8511191

Int. Cl.[5] B60R *19/08*

U.S. Cl. 293—109 **7 Claims**



1. A method of making a vehicle bumper assembly comprising a channel-section outer shell of injection molded plastics material for extending transversely across the front or rear of a motor vehicle and having integral end portions for extending along the sides of the motor vehicle, and spaced apart mounting brackets for mounting the bumper on the motor vehicle, wherein a transversely extending portion of the outer shell is substantially filled with an energy absorbing foam adhered to the inside of the outer shell; and the mounting brackets have arm portions molded into said foam, said method being characterized in that:

a. the outer shell is mounted in one part of a molding tool so that an inner surface portion thereof to be adhered to said foam forms a wall of the molding cavity of the tool;

b. the mounting brackets are mounted on a second part of the tool; and

c. the tool is closed and a foamable plastics material is injected to form a filling of said foam therein.

4,988,138

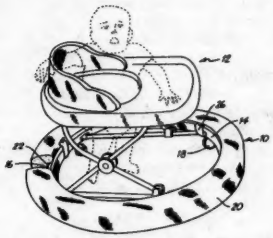
BUMPER GUARD FOR BABY WALKER

Jori L. Danna, St. Paul, and Mary M. Bauer, Woodbury, both of Minn., assignors to Baby Bumpers, Inc., St. Paul, Minn.

Filed Mar. 29, 1990, Ser. No. 502,062

Int. Cl.[5] B60R *19/42*

U.S. Cl. 293—127 **14 Claims**



1. A detachable bumper guard for use with a baby walker, the baby walker including a lower circular base having an outer perimetrical surface and wheels attached to the lower circular base by wheel shafts, the guard comprising:

a longitudinal cushioning main body sufficient in length to substantially encircle the perimetrical surface;

a slot disposed longitudinally in the main body adapted to receive at least a portion of the outer perimetrical surface; and

means for releasably attaching the main body to the lower circular base such that the perimetrical surface is in receiving relationship with the slot and the main body substantially encircles the perimetrical surface when the main body is attached to the lower circular base.

4,988,139

RETRACTABLE SUN VISOR WITH VARIABLE SHADING FOR AN AUTOMOBILE

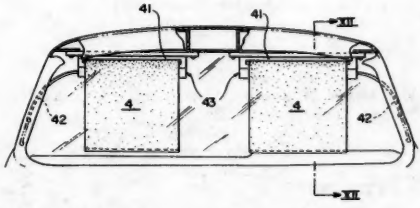
Masatoshi Yamada, Nagano, Japan, assignor to Asama Corporation, Nagano, Japan

Division of Ser. No. 217,842, Jul. 11, 1988, abandoned. This application Jul. 10, 1989, Ser. No. 377,190

Claims priority, application Japan, Mar. 16, 1988, 63-62293

Int. Cl.[5] B60J *3/02*

U.S. Cl. 296—97.2 **2 Claims**



1. A sun visor for an automobile comprising:

a flexible sunlight-shading member formed of a semitransparent material, the semitransparent material varying in transparency according to a position along said sunlight-shading member and wherein the transparency of said flexible sunlight-shading member gradually increases from a base portion to an upper portion thereof;

a housing for storing said flexible sunlight-shading member out of sight in an unused position, wherein said housing includes an opening through which said flexible sunlight-shading member is received;

means for slidably and incrementally removing said flexible sunlight-shading member from said housing to any one of

a plurality of sunlight-shading positions and inserting said flexible sunlight-shading member into said housing, said sunlight-shading member being conformable to an angle of a front windshield of the automobile;

a sealing member formed at an inner periphery of the opening for receiving the sunlight-shading member, said sealing member removing debris from said flexible sunlight-shading member upon insertion of said sunlight-shading member into said housing and thereby preventing debris from entering said housing; and

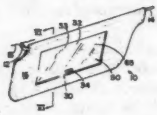
an auxiliary housing for storing a peripheral flexible sunlight-shading member out of sight in an unused position, said peripheral flexible sunlight-shading member being slidably removable from and into said auxiliary housing to a plurality of sunlight-shading positions in a direction perpendicular to a horizontal plane of said flexible sunlight-shading member, said auxiliary housing being positioned below said housing.

4,988,140

VISOR WITH AN ELECTRICALLY CONTROLLED VANITY MIRROR COVER

Kim L. Van Order, Hamilton, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Dec. 8, 1989, Ser. No. 447,824
Int. Cl.[5] B60J *3/04*
U.S. Cl. 296—97.2 **41 Claims**



1. A visor for a vehicle comprising:

a visor body including means for mounting said visor to a vehicle for movement between a raised stored position and a lowered use position, said body including a mirror mounted therein;

an electrically operated stationary cover for said mirror for selectively exposing said mirror for use and blocking said mirror when not in use, said cover fixedly mounted to said visor body adjacent and in front of said mirror; and

electrical control means for operating said cover.

4,988,141

FRAME FOR VEHICULAR HOOD

Yukiya Takada, Hamamatsu, Japan, assignor to Suzuki Motor Company Ltd., Hamana, Japan

Filed Mar. 29, 1989, Ser. No. 330,116
Claims priority, application Japan, May 20, 1988, 62-123383
Int. Cl.[5] B60J *1/14*
U.S. Cl. 296—102 **4 Claims**

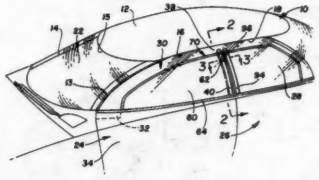
1. A frame for a vehicle flexible hood, comprising: a substantially L-shaped frame member for supporting a corner of the flexible hood with respect to a corner of the vehicle, said substantially L-shaped frame member having ends with stud members, engaging the vehicle body, and an intermediate bent portion between said ends, said studs being substantially coaxial for rotation of said substantially L-shaped frame member and a corner of the flexible hood about said stud members; a fixing member disposed on the outside of the vehicle body engageable with a fixing portion connected to said substantially L-shaped frame member adjacent said bent portion; a handle connected to said substantially L-shaped frame member at two points, adjacent said fixing portion, said handle jutting out from a plane of said substantially L-shaped frame member and extending into the inside of the vehicle body, whereby the L-shaped frame member and connected corner of the flexible hood may be opened by pushing out from the inside of the vehicle body and may be closed by pulling in from the inside of the vehicle body a belt with a snap hook, said belt being fastened around said handle and being connectable to a part of the vehicle in order to lock the position of said handle, said substantially L-shaped frame member and said connected corner of the flexible hood; and adjustment means for adjusting the position of said belt thereby allowing said substantially L-shaped frame member and said corner of the flexible hood to be locked in an open position.

4,988,142

TRANSPARENT UPPER DOOR FRAME

Maurice P. Chandler, Utica, and Michael S. Fylan, Lakeville, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 1, 1989, Ser. No. 444,641
Int. Cl.[5] B60J *5/00*
U.S. Cl. 296—146 **6 Claims**



1. In a vehicle body having a side door opening and a door hingedly mounted to open and close the door opening, the improvement comprising:

the vehicle door having a movable window panel mounted on the door for movement between a lowered open position and a raised closed position, and a window frame rigidly mounted on the door and defining a fixed upper edge portion of the door, said window frame and said window panel both being constructed of a transparent material.

4,988,143

DASHBOARD ASSEMBLY FOR CHILDREN'S RIDE-ON-VEHICLE

Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco, San Francisco, Calif.

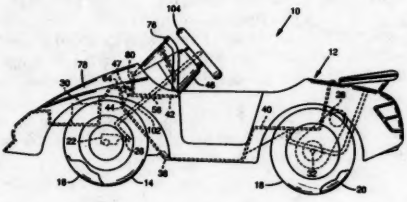
Filed Feb. 8, 1990, Ser. No. 476,986
Int. Cl.[5] B62D *25/08*
U.S. Cl. 296—177 **8 Claims**

1. In a children's ride-on vehicle having a unitary vehicle body construction, a floor pan area and a seat, a dashboard mounting structure comprising:

a ledge integrally formed and recessed in the vehicle body and having at least one pair of slots formed therein;

an abutment structure surrounding the ledge in the vehicle body; and

a dashboard structure constructed and arranged to rest on the ledge, having at least one pair of tangs thereon which



are constructed to be received in the slots in the ledge, and an abutment-contacting structure which contacts the abutment structure surrounding the ledge to maintain the dashboard in a desired location.

4,988,144

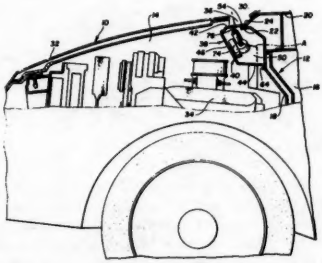
PLENUM AND WIPER MODULE REMOVABLE FOR ENGINE SERVICE

Roger E. Johnson, Utica; Thomas C. Jensen, Clarkston, and Robert A. Brani, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 16, 1990, Ser. No. 465,846

Int. Cl.[5] B62D *25/08*

U.S. Cl. 296—192 **3 Claims**



1. In a vehicle body having a bulkhead structure extending transversely between compartments for the passengers and the engine, the improvement comprising:

a C-shaped panel juxtaposed to the engine compartment side of the bulkhead structure and having upper and lower horizontally extending walls projecting forwardly from the bulkhead structure to overhang the engine and a vertically extending front wall spaced from the bulkhead by the upper and lower walls to define therewith a transverse airflow communicating passage, air inlet openings provided in the top wall to admit air into the passage, and removable fastening means removably fastening the panel on the bulkhead to permit removal thereof from overhanging the engine to enable engine repair and removal.

4,988,145

SEATING FURNITURE

Hartmut S. Engel, Freiberg am Necker, Fed. Rep. of Germany, assignor to Roeder GmbH Sitzmoebelwerke, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 57,589, Jun. 2, 1987, abandoned. This application Jun. 6, 1989, Ser. No. 363,346

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1986, 3618705; Sep. 22, 1986, 3632131; Feb. 10, 1987, 3704083

Int. Cl.[5] A47C *1/32*

U.S. Cl. 297—301 **34 Claims**

1. Seating furniture, comprising:

a variably inclinable seat including front and rear portions and left and right sides;

a variably inclinable backrest including upper and lower ends;

means for connecting said rear portion of said seat to said backrest to permit relative movement therebetween;

a frame disposed beneath said seat;

axle means attached to said frame and disposed beneath said front portion of said seat, defining a transverse pivot axis;

first and second links, situated respectively adjacent said right and ieft sides of said seat, said links extending generally from said axle means to said backrest and said links being pivotable about said transverse pivot axis;

spring means positioned between said links and said frame for supporting said links in a cantilever manner extending rearwardly from said axle means, said spring means acting between said links and said frame such that said links are biased into a basic position relative to said frame, in which said seat is in its uppermost position;

backrest pivot means for pivotally connecting a rear end of each said link to said backrest;

first and second levers disposed beneath said seat respectively at the left and right sides thereof;

seat pivot means for pivotally connecting a first end portion of each said lever to said seat;

frame pivot means for pivotally connecting a second portion of said lever to said frame, said frame pivot means being connected to each said lever at a lever position spaced from said first end thereof; and

means disposed between said links and said levers for transmitting movement of a front end of said links about said transverse pivot axis to said levers;

said means for transmitting causing a lowering of a front region of the seat on increasing inclination of the seat and corresponding change in inclination of said links.

4,988,146

PROCESS FOR THE PRODUCTION OF BRISTLE ARTICLES

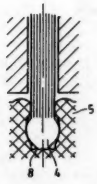
Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

Filed Aug. 10, 1989, Ser. No. 391,932

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1988, 3828571

Int. Cl.[5] A46D *3/04*

U.S. Cl. 300—21 **12 Claims**



1. Process for production of articles containing thermoplas-

tic bristles, the method comprising the steps of melting fixing-side ends of the thermoplastic bristles accompanied by a shortening of a length of the bristle and formation of a thickened portion, providing a thermoplastic bristle carrier having holes within at least zonally smaller free cross-section than a cross-section of the thickened portion of the bristles for receiving the thickened portion of the bristles, inserting the thickened portions into the holes of the bristle carrier, heating at least one of the thickened portions and a wall of the holes to a joining temperature between a transition temperature and a flow temperature with amorphous thermoplastic and between the flow temperature and a crystallite melting temperature with partly crystalline thermoplastics or maintaining the joining temperature in which the thermoplastics are in an entropy elastic state so as to enable the thickened portions to be inserted by thermoforming into the holes.

4,988,147

HYDRAULIC HIGH-PRESSURE PUMP FOR A VEHICLE BRAKE SYSTEM

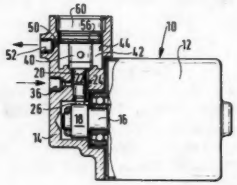
Wilhelm Zirps, Hemmingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 29, 1989, Ser. No. 459,172

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1989, 3907969

Int. Cl.[5] B60T *8/32*; F04B *21/02*

U.S. Cl. 303—116 **12 Claims**



1. A hydraulic high-pressure pump (**10**) for a brake system of a vehicle equipped with an anti-skid braking system, having a housing (**14**), at least one bore (**20**) in said housing, a pump cylinder (**22**) in said bore, a pump piston (**26**) disposed in said pump cylinder (**22**), and movable by a cam (**18**), an outlet valve (**40**) including a substantially cylindrical housing (**38**) supported coaxially on said pump cylinder (**22**) on a side remote from the cam (**18**), which outlet valve is seated in an enlarged, circular-cylindrical portion (**44**) of the bore (**20**) surrounding said outlet valve (**40**) to form an annular chamber (**42**), said outlet valve includes at least one outlet conduit (**46**) which discharges into said annular chamber (**42**), an outlet (**52**), a pump outlet bore (**50**) beginning at said enlarged bore portion (**44**) which extends to said outlet (**52**), means for closing the housing bore (**20**) and for retaining said pump piston cylinder (**22**) and said outlet valve housing (**38**) in the bore (**20**) of said pump housing (**14**), said annular chamber (**42**) is defined toward the cam substantially by a bore step (**32**) and a bore portion (**44**) of the pump housing (**14**) and away from the bore step (**32**) by a cap (**56**) fitted tightly into the bore portion (**44**), said annular chamber (**42**) has a dimension such that in combination with said pump outlet bore (**30**) a sufficient damping action occurs for smoothing out any pressure vibrations of any pulsating pumped fluid flow, said cap (**56**) engages the outlet valve housing (**38**), thereby forming a fluid volume in said annular chamber (**42**) and said pump outlet bore (**50**) is embodied as a throttle.

4,988,148

HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

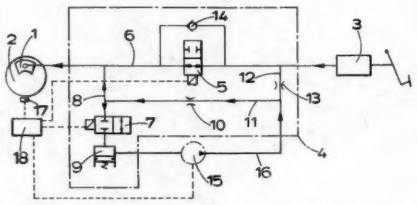
Glyn P. R. Farr, Warwickshire; Anthony E. Martin, Birmingham, and Robert G. Fuller, Coventry, all of England, assignors to Lucas Industries public limited company, England

Filed Mar. 2, 1989, Ser. No. 317,780

Claims priority, application United Kingdom, Mar. 9, 1988, 8805598; Jul. 21, 1988, 8817412

Int. Cl.[5] B60T *8/44*

U.S. Cl. 303—116 **11 Claims**



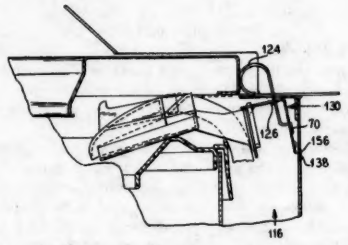
1. A hydraulic anti-lock braking system for vehicles comprising a master cylinder for applying hydraulic fluid under pressure to a brake on a wheel to apply said brake, a modulator responsive to the behavior of said braked wheel to modulate the supply of fluid from said master cylinder to said brake in an anti-lock mode, and a pump having an output which generates the energy necessary to recover fluid after the pressure applied to said brake had first been released to prevent said wheel from locking, wherein said modulator incorporates a first valve responsive to anti-lock signals, means defining an expansion chamber to which fluid is relieved from said brake in an anti-lock mode, a flow valve comprising a first substantially constant flow restrictor so constructed and arranged that said output from said pump is shared between said brake and said master cylinder and a second constant flow restrictor located in parallel with and additional to said flow valve for attenuating pressure oscillations of said system, operation of said second constant flow restrictor being independent of said flow valve.

4,988,149

REMOVABLE CABINET TOP FOR FRONT-SERVICEABLE APPLIANCE

James R. Mulder, Berrien Township, Berrien County, and Carl E. Eichman, Lincoln Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 19, 1989, Ser. No. 423,841
Int. Cl.[5] A47B 77/08
U.S. Cl. 312—223 23 Claims



1. A front-serviceable appliance of the type including a cabinet having a cabinet top and requiring the removal of said cabinet top from the rest of said cabinet for servicing, said appliance including in combination:

resilient retaining means for securing said cabinet top to the rest of said cabinet and simultaneously preventing accidental disconnection of an electrical connector disposed on said cabinet and actuated by movement of said cabinet top;

vacuum-break mounting means, disposed on said cabinet and actuable by said cabinet top, for permitting movement of a water inlet vacuum break from an operating position to a service position; and

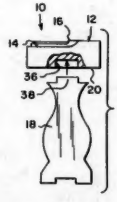
wherein said cabinet top is horizontally slidable into a position actuating said vacuum-break mounting means and permitting the securing of said cabinet top by said retaining means.

4,988,150

KEYBOARD STAND

Curnal Lindow, 220-29 101st Ave., Queens Village, N.Y. 11429, and George Spector, 233 Broadway #3815, New York, N.Y. 10007

Filed Oct. 30, 1989, Ser. No. 429,134
Int. Cl.[5] A47B 91/00
U.S. Cl. 312—256 1 Claim



1. A knock-down keyboard stand comprising:

(a) a table top having a recess therein for holding a keyboard therein;

(b) a pair of legs with top and bottom ends for supporting and elevating said table top;

(c) said table top having spaced apart end slots which receive top ends of said legs in non-rotatable condition for removably attaching said legs in a spaced apart relationship;

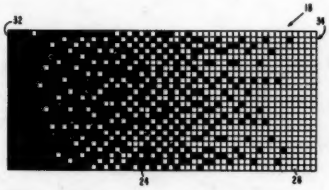
(d) a compartment within the bottom of said table top, for storing said legs therein after said legs are removed from said table top, further including a circular post with spaced stabilizers extending radially from a base of said post and a removable washer adapted to be mounted about said post on said stabilizers preventing said stabilizers from entering said slots whereby said legs can be converted for mounting rotatably to non-rotatably.

4,988,151

METHOD FOR MAKING EDGE FADED HOLOGRAMS

Gaylord E. Moss, Marina del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 31, 1989, Ser. No. 401,310
Int. Cl.[5] G03H 1/04, 1/28, 1/06
U.S. Cl. 350—3.66 13 Claims



1. A method of making edge-faded holograms comprising the steps of:

desensitizing holographic medium exposure step comprising the sub-steps of:

providing a mask having a predetermined pattern of adjacent opaque and transparent pixel areas,

positioning the mask between the holographic medium and a source of incoherent light,

exposing the medium through the mask to form a corresponding spatial pattern of photo-desensitized pixel areas corresponding to desired transparent pixel areas and photosensitive areas corresponding to desired recorded hologram areas, and

recording the hologram with the mask removed; and

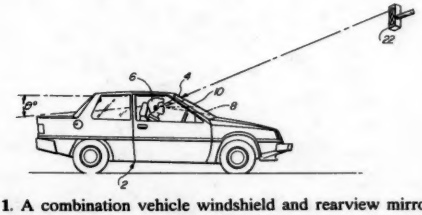
exposing a holographic medium having edges with a spatial pattern of laser light to form a predetermined pattern of pixel areas in which some areas contain a holographic element and other areas are transparent.

4,988,152

HOLOGRAPHIC REARVIEW MIRROR AND METHOD OF PRODUCING SAME

John E. Wreede, Monrovia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 6, 1987, Ser. No. 797
Int. Cl.[5] G02B 5/32, 27/14
U.S. Cl. 350—3.7 15 Claims



1. A combination vehicle windshield and rearview mirror comprising:

a curved transparent substrate adapted for mounting on a portion of the vehicle windshield while permitting observation of the forward motion of the vehicle;

a thin film holographic optical reflective element laminated

onto the substrate to provide a reflection of light coming from the rear of the vehicle to the driver, the optical element further limiting transmission of only some of the light coming from the front of the vehicle to the driver; and

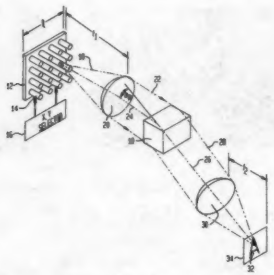
a pair of reflective holograms developed on the coating at wavelength bands having different maximum wavelength peaks.

4,988,153

HOLOGRAPHIC MEMORY READ BY A LASER ARRAY

Eung-Gi Paek, Freehold, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Dec. 22, 1989, Ser. No. 455,308
Int. Cl.[5] G03H *1/22*
U.S. Cl. 350—3.8 **9 Claims**



1. A holographic memory system for reading a holographic recording medium recorded with angularly multiplexed pages of information, comprising:

a two-dimensional array of surface-emitting lasers formed on an integrated circuit chip;

means for activating a selected one of said lasers to produce a coherent optical output beam; and

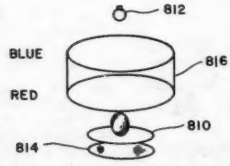
a collimating lens system for collimating said output beam produced by any of said activated lasers to fall upon an entire area of said recorded holographic medium at an incident angle dependent upon which of said lasers has produced said output beam.

4,988,154

METHOD AND APPARATUS OF PRODUCING AN ARCUATE RAINBOW HOLOGRAM

Matthew E. Hansen, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sep. 16, 1988, Ser. No. 245,723
Int. Cl.[5] G03H *1/06, 1/26, 1/22*
U.S. Cl. 350—3.86 **62 Claims**



1. A method for making a hologram of an object comprising the steps of:

(a) limiting the information content of a wave front of coherent light representing the object to a selected portion of the wave front the selected portion forming an arcuate window through which the selected portion is preserved and the window having a length substantially greater than its thickness;

(b) deriving an information-limited image of the object from the information-limited wave front; and,

(c) recording the image on an image-receiving surface.

4,988,155

IN-LINE FIBER OPTIC PROBE INTERFACE

Richard S. Harner, and Charles J. Myers, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 22, 1989, Ser. No. 369,745
Int. Cl.[5] G02B *6/00*
U.S. Cl. 350—96.1 **26 Claims**

1. An in-line fiber optic probe interface comprising:

sample cell means having an optical axis therein;

fiber optic probe means disposed of said optical axis in said sample cell means,

a plurality of seal means circumferentially engaging said probe means at more than one location along the length thereof for sealing said probe means within said sample cell means and for maintaining said probe means in substantially consistent optical alignment on said predetermining optical axis defined in said sample cell means;

a bore in said sample cell means having an axis coaxial with and defining said optical axis,

a controller housing means disposed in said bore,

said controller housing means being sealed to said bore by first seal means,

a bore through said controller housing;

said probe means disposed in said controller housing bore, and

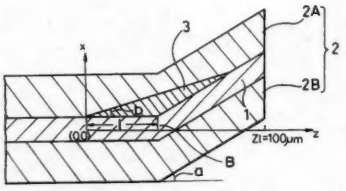
second seal means disposed between said probe means and said controller housing means.

4,988,156

BENT WAVEGUIDE FOR AN OPTICAL INTEGRATED CIRCUIT

Kimio Shigihara, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 31, 1988, Ser. No. 238,530
Claims priority, application Japan, Sep. 2, 1987, 62-219824
Int. Cl.[5] G02B *6/10*
U.S. Cl. 350—96.12 **7 Claims**



1. A bent waveguide for an optical integrated circuit comprising:

a core region having a first refraction index;

first and second cladding regions having a second refractive index disposed on opposite sides of and sandwiching said core region to form a waveguide comprising said core region and said first and second cladding regions, said waveguide having a bent portion bending toward an inner side and away from an outer side; and

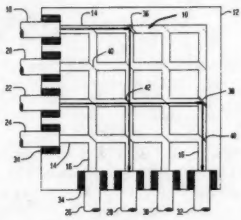
a first local waveguide region disposed between and contiguous to said first cladding region and said core region at said inner side of said bent portion, said first local waveguide region having a third refractive index larger than said first and second refractive indices for reducing the loss of light from the core region at the bent portion.

4,988,157

OPTICAL SWITCH USING BUBBLES

Janet L. Jackel, and Walter J. Tomlinson, III, both of Holmdel, N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Mar. 8, 1990, Ser. No. 490,362
Int. Cl.[5] G02B 6/10, 6/26
U.S. Cl. 350—96.13 14 Claims



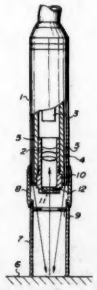
1. An optical switch, comprising:
a first optical waveguide formed on a surface of a substrate;
a second optical waveguide formed on said surface of said substrate and intersecting said first waveguide at an intersection;
a slot formed across said first and second waveguide at said intersection;
a liquid selectively disposed in said slot; and
means for selectively forming a gaseous bubble in said liquid in at least a portion of said slot adjacent said first and second waveguides at said intersection;
wherein said forming means comprise electrolytic forming means for electrolyzing said liquid to create said bubble at said intersection;
whereby a light signal propagating on said first optical waveguide selectively continues in said first optical waveguide across said intersection when said bubble is not formed at said intersection but is selectively switched to said second optical waveguide when said bubble is formed at said intersection.

4,988,158

IMAGE PICKUP HEAD FOR IMAGE PICKUP DEVICE

Masao Yamamoto, Tama, Japan, assignor to Mitsubishi Kasei Corporation and Scalar Corporation, both of Tokyo, Japan

Filed Feb. 2, 1990, Ser. No. 474,332
Claims priority, application Japan, Feb. 4, 1989, 1-026462; Oct. 20, 1989, 1-273419
Int. Cl.[5] G02B 6/32
U.S. Cl. 350—96.18 7 Claims



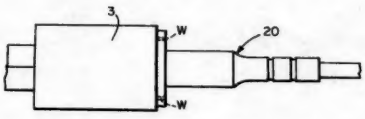
1. An image pickup head for an image pickup device comprising:
a lens tube;
an optical system within said lens tube, said optical system having an optical axis;
an image pickup element in said lens tube arranged to pick up an optical image introduced through said optical system;
a light guide for guiding light from a light source to a projection end of said light guide spaced from the light source, said projection end of said light guide being located annularly about the optical axis of said optical system in said lens tube so that light is annularly projected from said projection end to uniformly illuminated a surface;
a first polarizing element having a predetermined polarization plane, arranged in an optical path of light projected from said projection end of said light guide onto said surface;
a second polarization element having a predetermined polarization plane, arranged on an optical path of light reflected at said surface and introduced through said optical system to said image pickup element; and
operative means for varying the polarization planes of said first and second elements relative to each to permit one of the passage of reflected light from the surface to the image pickup element and elimination of reflected light from the surface to the image pickup element.

4,988,159

FIBER TAILED OPTOELECTRONIC TRANSDUCER

Andrew S. Turner, Paignton; Trevor E. J. Hext, Newton Abbot, and Adrian P. Janssen, Exeter, all of Great Britain, assignors to STC PIC, London, England

Filed Aug. 9, 1988, Ser. No. 230,057
Claims priority, application United Kingdom, Aug. 19, 1987, 8719590
Int. Cl.[5] G02B 6/36, 7/26
U.S. Cl. 350—96.20 16 Claims



1. An optical electronic package comprising an optical receiver or emitter device having an optical fibre tail end optically coupled thereto via an optical sealed window, the package comprising a lens focussing optical energy passing between said device and said tail end, an hermetic container encasing the device and having said optical window therein, a fibre termination body rigidly holding the fibre tail therein, said body having a thin flange at said tail end extending radially from the optical axis of the device said container having a wall abutting the flange, said container and said body being permanently held together by a plurality of spot welds through said flange onto said wall so that the focussed optical energy is optimally coupled between said device and said tail end.

4,988,160

METHOD FOR FIXING OPTICAL WAVEGUIDES IN A CONNECTOR HOUSING

Karl-Ernst Luettgert, and Klaus Schulz, both of Berlin, Fed. Rep. of Germany, assignors to Siemensaktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,238
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1988, 3838974
Int. Cl.[5] G02B 6/36
U.S. Cl. 350—96.20 6 Claims

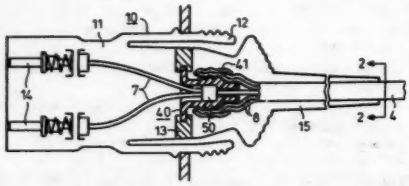
1. A method for fixing optical waveguide leads in a connector, having a bore for receiving the leads, comprising the steps of:
providing an optical waveguide cable including optical

waveguide leads together with elements for transmitting tensile force;

securing end portions of said elements at the periphery of the cable to a portion of said connector having a bore therein;

applying a tensile force to said elements of said optical waveguide cable used for transmitting tensile force;

providing a positioning member having openings formed therethrough;



inserting said positioning member in the bore in said connector portion and passing said optical waveguide leads through substantially stress-free said openings;

compressing said positioning member to secure said waveguide leads therein and to deform said openings so that spaces between the inner wall of each opening and a respective optical waveguide lead are formed; and

filling the spaces with glue to further secure each optical waveguide lead within a respective opening.

4,988,161

OPTICAL FIBER FIXING ELEMENT AND METHOD OF MANUFACTURING SAME

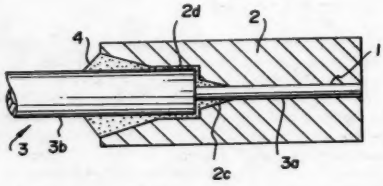
Junji Fujikawa, and Fumiaki Tamura, both of Siga, Japan, assignors to Nippon Electric Glass Co., Ltd., Otsu, Japan

Filed Aug. 25, 1989, Ser. No. 398,561

Claims priority, application Japan, Aug. 26, 1988, 63-213149

Int. Cl.[5] G02B *6/36, 7/26*

U.S. Cl. 350—96.20 **3 Claims**



1. A method of manufacturing an optical fiber fixing element comprising the steps of forming an erosion resistant film on an outer surface, other than an end face, of a glass tube having an inner hole for receiving a clad portion of an optical fiber therein, treating the end face of the glass tube with a glass erosive solution to thereby form the end face with a flared portion, and grinding the flared portion to form a recess for fitting a cover portion of the optical fiber thereinto.

4,988,162

RADIATION RESISTANT MULTIPLE FIBER

Hiroyuki Hayami, Itami, Japan, assignor to Mitsubishi Cable Industries, Ltd., Amagasaki, Japan

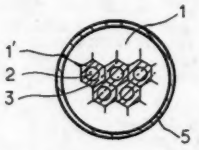
Filed Jun. 14, 1989, Ser. No. 365,989

Claims priority, application Japan, Jun. 29, 1988, 63-162229

Int. Cl.[5] G02B *6/06*

U.S. Cl. 350—96.25 **5 Claims**

1. A radiation resistant multiple fiber, wherein a number of optical fiber elements each of which comprises a core composed of a pure silica glass and a cladding layer formed on the core and composed of a doped silica glass are mutually heat-fused, and said pure silica glass of the core having a chlorine



content of lower than 1 ppm, an OH group content of lower than 1000 ppm, and also fluorine content of at least 100 ppm.

4,988,163

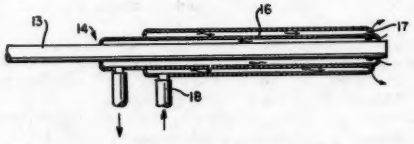
INFRARED LASER SYSTEM FOR SURGICAL PURPOSES EMPLOYING COMPOUND FIBER PROBE

Martin G. Cohen, Northport; William I. Kern, Smithtown, and Stephen Trokel, New York, all of N.Y., assignors to Quantronix Corp., Smithtown, N.Y.

Filed Aug. 17, 1989, Ser. No. 395,342

Int. Cl.[5] G02B *6/02, 6/16;* **A61B** *1/00*

U.S. Cl. 350—96.29 **18 Claims**



1. In a low energy laser system for surgical purposes having a source of pulsed laser energy above 1.8 microns in wavelength and optical fiber means transmissive to said laser energy for delivering sufficient amounts of laser energy to body tissues for performing delicate surgical procedures wherein the improvement comprises a compound fiber element included in said optical fiber means having a body portion of fluoride glass fiber, an elongated tip portion of a hard, moderately-transparent glass or crystalline fiber and means for optically coupling the tip portion to the fluoride glass body.

4,988,164

ANTI-REFLECTION FILM FOR SYNTHETIC RESIN OPTICAL ELEMENTS

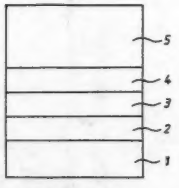
Hajime Ichikawa, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Apr. 3, 1989, Ser. No. 332,809

Claims priority, application Japan, Apr. 25, 1988, 63-102287

Int. Cl.[5] G02B *1/10*

U.S. Cl. 350—165 **4 Claims**



1. An anti-reflective film comprising: a synthetic resin optical substrate, and four film layers laminated on the substrate, the four film layers comprising, for a wavelength of λ=400–700 nm, a first film layer on a surface of the substrate composed of SiO and having an optical thickness of 0.06–0.125

λ, a second film layer composed of SiO_2 on the first layer and having an optical thickness of 0.043–0.125 λ, a third film layer composed of CeO_2 on the second layer and having an optical thickness of 0.06–0.625 λ, and a fourth film layer composed of SiO_2 on the third layer and having an optical thickness of 0.165–0.34 λ.

4,988,165

OBJECT LENS DRIVING DEVICE

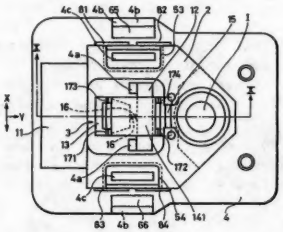
Mitsuo Ishii; Yukio Kurata, both of Nara, and Hideyoshi Yamaoka, Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 24, 1989, Ser. No. 356,136

Claims priority, application Japan, May 25, 1988, 63-69064[U]

Int. Cl.[5] G02B *7/02*

U.S. Cl. 350—245 **9 Claims**



9. A driving device for an object lens comprising:

a movable section including an object lens;

a base member operatively connected to said movable section;

a resilient hinge member operatively connected between said movable section and said base member;

rotational means for effecting relative rotation of said movable section with respect to said base member about a rotational axis passing through said hinge member; and

means for locating the center of gravity of the movable section and the balancing position of the moment of inertia of the movable section at substantially the same point.

4,988,166

SIGHTING ARRANGEMENTS

Paul J. Cook, Stanwell, Great Britain, assignor to Samuelson Group plc, London, England

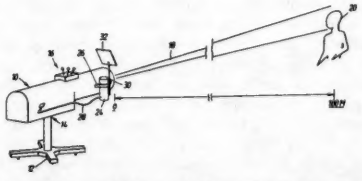
PCT No. PCT/GB87/00089, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO87/04805, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 6, 1987, Ser. No. 230,832

Claims priority, application United Kingdom, Feb. 7, 1986, 8603054

Int. Cl.[5] G02B *27/00, 7/00*

U.S. Cl. 350—321 **20 Claims**



1. A sight for use with a spotlight, said sight comprising a partly reflective panel through which an operator may view a target area, said panel being transverse to an axis of a light beam emitted from a light source and inclined with respect to said axis thereof, said sight having said light source and an imaging means arranged to produce a virtual image of the light beam from said source on the panel, at or near the target area as seen through the panel, said imaging means including an adjustable focusing means arranged to enable the virtual image to be located at a selected distance from the panel corresponding to the distance of the target area, said selected distance being variable between substantially infinity and a closer distance, and means for adjusting the position of the panel to effect adjustment of horizontal and vertical positions of the virtual image as seen in the panel.

4,988,167

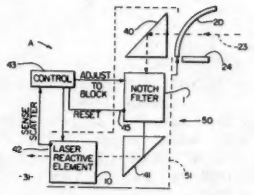
LIGHT BLOCKING AND VISION RESTORATION APPARATUS WITH GLINT CONTROL

James L. Fergason, 92 Adam Way, Atherton, Calif. 94025

Filed Aug. 10, 1988, Ser. No. 230,622

Int. Cl.[5] G02F *1/133*

U.S. Cl. 350—337 **7 Claims**



1. A system for controlling light, comprising

apparatus for responding to incident electromagnetic radiation, including

a first medium through which incident electromagnetic radiation may be transmitted;

liquid crystal means positioned with respect to said first medium for responding to a characteristic of the incident electromagnetic radiation to cooperate with such first medium to effect refraction of such electromagnetic radiation at an interface of said first medium and said liquid crystal means; and

apparatus for filtering a wavelength of light, including a variable polarization rotator means for supplying input light at a prescribed angle of polarization, variable dispersion means for rotating the plane of polarization of such input light an amount that is a function of the wavelength of such input light, and analyzer means for blocking transmission of that light which is output by said variable dispersion means and has a plane of polarization which is crossed relative to the axis of polarization of said analyzer means.

4,988,168

TFT LCD DEVICE HAVING COLOR FILTER LAYER DECAL

Jack A. Dickerson; James C. Greeson, Jr., and Neil M. Poley, all of Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

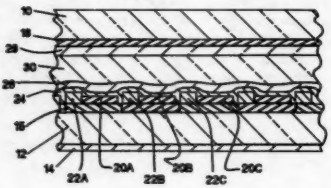
Filed Jun. 25, 1987, Ser. No. 66,387

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—339 F **9 Claims**

1. In a liquid crystal display device of the type having front and rear glass panels, an array of thin film transistors with associated transparent pel electrodes, a transparent electrode layer and a liquid crystal material interposed between the pel electrodes and the transparent electrode layer, the improvement comprising a color filter layer in the form of a decal

having appropriate color regions, said decal being affixed to a surface of one of said glass panels using known decal transfer



methods, said surface being one facing the other of the glass panels.

4,988,169

OPTICAL SIGNAL CONTROL METHOD AND APPARATUS

Nigel G. Walker, Ipswich, England, assignor to British Telecommunications public limited company, London, England

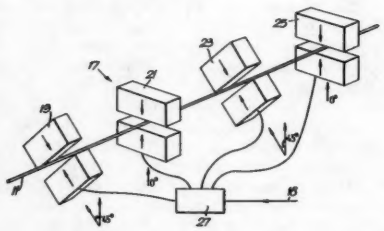
PCT No. PCT/GB87/00653, § 371 Date May 20, 1988, § 102(e) Date May 20, 1988, PCT Pub. No. WO88/02127, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 18, 1987, Ser. No. 201,122

Claims priority, application United Kingdom, Sep. 22, 1986, 8622768; Mar. 11, 1987, 8705746; Mar. 27, 1987, 8707441

Int. Cl.[5] G02F *1/01*

U.S. Cl. 350—371 **20 Claims**



1. Polarisation controller for maintaining a chosen relationship between two polarisation states derived from a first polarisation state and a second polarisation state, where both said first and second polarisation states may vary with time, the controller comprising:

four variable bireferingent elements,

wherein the four birefringent elements are arranged to rotate polarisation about sequentially orthogonal axes in the Poincare sphere; and

control means for maintaining said relationship by altering the birefringence of each of the elements as required consequent upon a variation in at least one of the first polarisation state and the second polarisation state, and including means for selectively controlling the elements in such a manner that at least each of the first and fourth elements can undergo an adjustment procedure to alter the birefringence of each such element in order to avoid exceeding a working limit for each such element, while said relationship is still maintained, and such that the magnitudes of the birefringences of all the elements are consequently constrained within working limits.

4,988,170

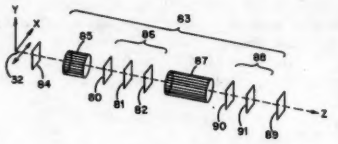
QUASI-ACHROMATIC OPTICAL ISOLATORS AND CIRCULATORS

Carl F. Buhrer, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 31, 1989, Ser. No. 331,428

Int. Cl.[5] G02F *1/09*; G02B *5/30, 27/28*

U.S. Cl. 350—377 **45 Claims**



1. A quasi-achromatic optical isolator having first and second ports between which a light beam may propagate, comprising:

a first plane polarizer adjacent said first port of said isolator:

two or more nonreciprocal optical rotators;

two or more linearly birefringent plates; and

a second plane polarizer adjacent said second port of said isolator:

said nonreciprocal optical rotators and said linearly birefringent plates being positioned in alternating sequence between said first and second plane polarizers.

4,988,171

IMAGING DEVICE AND ENDOSCOPE SYSTEM PROVIDED WITH THE SAME

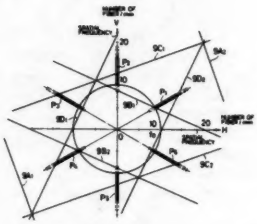
Akira Yokota, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 24, 1988, Ser. No. 198,058

Claims priority, application Japan, May 25, 1987, 62-127458

Int. Cl.[5] G02B *5/30*

U.S. Cl. 350—404 **14 Claims**



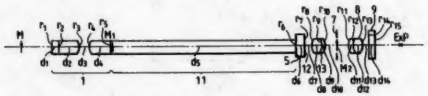
9. An endoscope observing device comprising an endoscope provided with a first image guide fiber bundle; and image forming lens system through which an image transmitted onto an exit end face of said first image guide fiber bundle is formed; a second image guide fiber bundle receiving the image formed through said image forming lens system on an entrance end face thereof; and an optical low-pass filter arranged in an optical path between said exit end face of said first image guide fiber bundle and said entrance end face of said second image guide fiber bundle, said optical low-pass filter having trap lines such that at least one of said trap lines traverses substantially an area in which spectrum components of specific spatial frequencies depending on an array of individual fibers in an image on said exit end face of said first image guide fiber bundle formed on said entrance end face of said second image guide fiber bundle through said image forming lens system are distributed on a two-dimensional spatial frequency plane.

4,988,172

OPTICAL SYSTEM FOR ENDOSCOPES

Iwao Kanamori, Fussa; Akira Kikuchi, Hachiouji, and Minoru Okabe, Yokohama, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,142
Claims priority, application Japan, Jan. 30, 1988, 63-19906; May 6, 1988, 63-110172
Int. Cl.[5] G02B *23/00*
U.S. Cl. 350—413 13 Claims



1. An optical system for endoscopes comprising, in order from an object side:

an objective lens unit;

an image transmitting optical system including an inhomogeneous lens having an entrance end face receiving light coming from said objective lens unit and an exit end face emanating the light received by said entrance end face and making refraction index small progressively in going from a center portion toward a periphery thereof;

an aperture stop provided on the exit end face of said inhomogeneous lens; and

an imaging lens imaging a beam of light emanating from the exit end face,

the exit end face of said inhomogeneous lens satisfying the following condition;

$$0.15\,P<C<0.35\,P$$

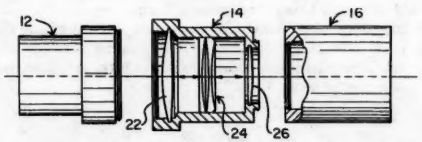
where reference symbol P represents the pitch (period) of the homogeneous lens and C the distance from the exit end face of the inhomogeneous lens to the imaging position in the inhomogeneous lens closest to the end face.

4,988,173

MODULAR AFOCAL VARIATOR OPTICAL FOCUSING SYSTEM

H. Jay Margolis, 704 Mohawk Dr., #15, Boulder, Colo. 80303

Continuation-in-part of Ser. No. 169,271, Mar. 17, 1988, abandoned. This application Dec. 19, 1988, Ser. No. 286,307
Int. Cl.[5] G02B *15/02, 15/15*
U.S. Cl. 350—423 18 Claims



1. A modular optical system including in combination a front element module which carries a lens system and a rear element module which carries a lens system, said front element module and said rear element module together define an operational optical instrument, and a central element module which carries a lens system, said central element module being intermediate said front element module and said rear element module, said modular optical system has the ability to have the actual focal length of said lens system carried by said front element module varied in conjunction with said lens system carried by said rear lens system module wherein the improvement comprises:

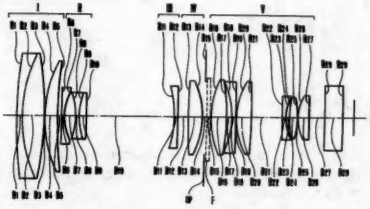
said optical system carried by said central element module carries an afocal variator, and wherein connecting means are carried by said central element module, said front element module and said rear element module, whereby said element modules can be connected in optical series.

4,988,174

ZOOM LENS

Akihisa Horiuchi, Tokyo, and Hiroyuki Hamano, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 23, 1989, Ser. No. 355,348
Claims priority, application Japan, May 31, 1988, 63-134129
Int. Cl.[5] G02B *15/14*
U.S. Cl. 350—427 2 Claims



1. A zoom lens comprising, from an object side to an image plane side, a first lens unit of positive refractive power for focusing, a second lens unit of negative refractive power having an image magnification varying function, a third lens unit of negative refractive power for compensating for the image shift resulting from variation of the image magnification, a fourth lens unit of positive refractive power for making a light beam from said third lens unit to be an almost divergent light beam, and a fifth lens unit having an image forming function, said fifth lens unit including, from the object side of the image plane side, a first lens of which both lens surfaces are convex, a negative second lens having a concave surface facing the object side, a positive third lens which has a strong refracting surface facing the object side and of which both lens surfaces are convex, a negative fourth lens having a concave surface facing the image plane side, a fifth lens which has a strong refracting surface facing the image plane side and of which both lens surfaces are convex, and a positive sixth lens having a strong refractive surface directed toward the object side, and said zoom lens satisfying the following conditions:

$$1.05<f4/L<1.3$$

$$20.4<|R5,4/fw|<30.6$$

$$0<fw/R5,7<0.076$$

$$1.58<(N5,1+N5,3+N5,5+N5.6)/4<1.85$$

where L is a distance from a convergent point of an on-axial light beam having passed through said first to third lens units to a front principal point of said fourth lens unit, f4 is a focal length of said fourth lens unit, N5,i is a refractive index of a medium of the i-th lens in said fifth lens unit, R5, i is a radius of curvature of the i-th lens surface in said fifth lens unit, and fw is the shortest focal length of the entire lens system.

4,988,175

OPTICAL MAGNIFYING SYSTEM

Donald J. Strittmatter, and David R. Wickholm, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 7, 1989, Ser. No. 432,706
Int. Cl.[5] G02B *9/34, 9/12, 5/20*
U.S. Cl. 350—469 16 Claims

1. An optical magnifying system comprising:

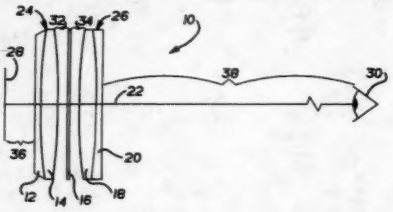
a primary lens, said primary lens being a negative convex-concave lens defining an optical axis, said primary lens

being disposed a predetermined working distance from the object being viewed;

a secondary lens, said secondary lens being a positive biconvex lens disposed adjacent said primary lens and centered with respect to said optical axis;

a tertiary lens, said tertiary lens being a positive biconvex lens disposed proximate said secondary lens and centered with respect to said optical axis;

a filter, said filter being a plane parallel polarizing element



which may be a glare reducing element disposed proximate said secondary and tertiary lenses and centered with respect to said optical axis; and

a quaternary lens, said quaternary lens being a negative concave-convex lens disposed adjacent said tertiary lens and centered with respect to said optical axis, said quaternary lens being disposed with respect to said secondary lens such that said tertiary lens is disposed therebetween, said lenses focusing upon said object such that an image is formed at infinity.

4,988,176

PROJECTION LENS

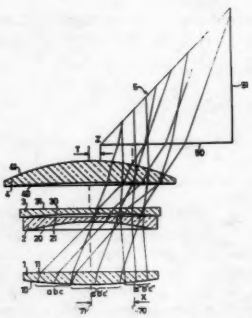
Stig Berglund, Stockholm, Sweden, assignor to Optica Nova Onab AB, Sweden

Filed Aug. 30, 1989, Ser. No. 400,376

Claims priority, application Sweden, Sep. 15, 1988, 8803253

Int. Cl.[5] G02B *9/36*

U.S. Cl. 350—470 **6 Claims**



1. A projection lens comprising four coaxial lenses **(1–4)** each with a spherically curved surface of which, int he direction from the object side **(14)** to the picture side **(15)**, the first lens **(1)** has a convex surface **(10)** facing the object side, the second lens **(2)** and the third lens **(3)** are located close together and spaced from the first lens **(1)** and the fourth lens **(4)**, and the fourth lens **(4)** has a convex surface **(41)** facing the picture side, wherein the surface **(11)** of the first lens **(1)** facing the picture side is planar, and the surfaces **(21, 31)** of the second **(2)** and third **(3)** lenses facing the picture side are planar, the surfaces **(20, 30)** of the second **(2)** and third **(3)** lenses facing the object side are concave and the surface **(40)** of the fourth lens **(4)** facing the object side is planar or slightly convex.

4,988,177

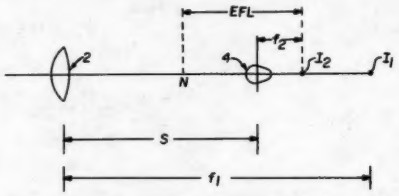
LIGHT CONCENTRATING LENS SYSTEM

Jerome J. Wolken, 5817 Elmer St., Pittsburgh, Pa. 15232

Continuation-in-part of Ser. No. 518,081, Jul. 28, 1983, abandoned. This application Dec. 4, 1986, Ser. No. 938,018

Int. Cl.[5] G02B *23/06, 17/08*

U.S. Cl. 350—501 **2 Claims**



1. A lens system comprising:

at least one elongated tubular housing member,

each said housing member having secured therewithin an imaging lens and an elongated generally pear-shaped concentrating lens,

said concentrating lens having an exteriorly generally convex entrance surface and an exteriorly generally convex exit surface,

said entrance surface being generally spherical and said exit surface being generally spherical,

said imaging lens being spaced from said concentrating lens by a predetermined distance,

said concentrating lens disposed within the focal length of said imaging lens,

said entry end surface facing said imaging lens,

said entry end surface having a radius of curvature which is about 1.5 to 4.0 times the exit end surface radius of curvature,

said entry end surface having a radius curvature of about 1.9 to 2.3 times the exit end radius of curvature,

the exterior surface of said concentrating lens between said entry end surfaces and said exit end surfaces being substantially parabolic,

said concentrating lens being substantially symmetrical about its longitudinal axes,

an entrance pupil disposed generally transversely with respect to said concentrating lens longitudinal axis generally where said entry surface meets said substantial parabolic surface,

an exit pupil disposed generally transversely with respect to said concentrating lens longitudinal axis generally where said exit surface meets said substantially parabolic surface,

said entrance pupil being substantially circular,

said exit pupil being substantially circular, and

a line connecting diametrically opposed portions of said exit pupil and said entrance pupil in passing through said amplifying lens longitudinal axis will form an angle with said axis of about 10 to 25 degrees.

4,988,178

OUTSIDE REAR-VIEW MIRROR FOR VEHICLES

Klaus Eifert, Stadtprozelten, Fed. Rep. of Germany, assignor to Hohe KG, Collenberg, Fed. Rep. of Germany

Filed Jun. 1, 1989, Ser. No. 360,104

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1988, 8807152[U]

Int. Cl.[5] G02B *7/18*

U.S. Cl. 350—631 **17 Claims**

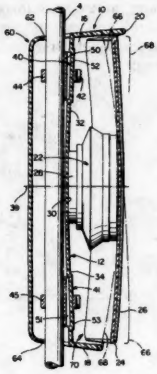
1. Outside rear-view mirror comprising

a mirror housing for holding a mirror glass, and

a mounting apparatus for mounting the mirror housing to a bar fixed to a car body, the mounting apparatus including two mounting devices formed in the mirror housing and spaced along the bar, each mounting device being formed

proximate to one of two opposing lateral walls of the mirror housing,

at least one of the mounting devices including at least one intermediate member inserted between the bar and the mirror housing,



each mounting device including a mounting profile formed from a base wall of the mirror housing for receiving said at least one intermediate member.

4,988,179

ELECTROMAGNETICALLY LOCKING MIRROR GLASS ADJUSTING SYSTEM

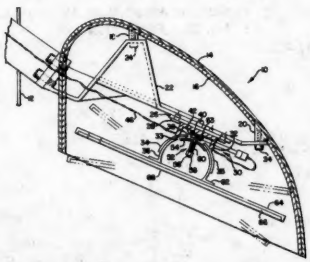
David A. Stensland, Monroeville, Ind., assignor to Navistar International Transportation Corp., Chicago, Ill.

Filed Apr. 19, 1989, Ser. No. 342,502

The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.

Int. Cl.[5] G02B *7/18*

U.S. Cl. 350—637 **12 Claims**



1. A mirror glass adjustment system comprising: inner and outer mounting elements arranged in close proximity, at least one of said elements being movable selectively relative to the other; resiliently biased clamping means for releasably coupling said mounting elements one to the other; a mirror glass fixedly mounted to a movable one of said mounting elements; electromagnet means selectively energizable to control the degree of coupling said mounting elements; a source of electrical power; switch means connected between said electromagnet means and said electrical power source operates selectively to place said electromagnetic means in energized and deenergized conditions; and said mirror glass capable of being manipulated to assume a selected orientation upon relative change in the dispositional relationship of said inner and outer elements in one condition of said electromagnet means and fixed at said selected orientation in the other condition of said electromagnetic means.

4,988,180

SAFETY MIRROR ASSEMBLY FOR AUTOMOBILE SUN VISORS

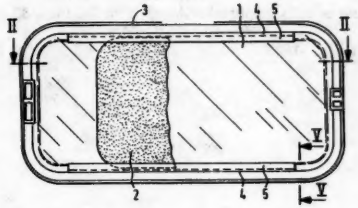
Carlos Gabas, Barcelona, Spain, assignor to Industrias Techno-Matic, S.A., Barcelona, Spain

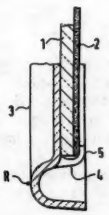
Filed May 29, 1990, Ser. No. 529,905

Claims priority, application Spain, Jun. 5, 1989, 8901954

Int. Cl.[5] G02B *5/08*

U.S. Cl. 350—641 **3 Claims**





1. A safety mirror assembly for automobile sun visors, comprising a conventional glass mirror having one of an adhesive layer and tape on the reflective surface side; and a transparent integral cover having a predetermined shape, said transparent integral cover being made as one piece from a plastic material and having dimensions big enough to accommodate said glass mirror, said transparent integral cover having a continuous frame that has no sharp edges and means for fitting and securing the glass mirror inside said transparent integral cover.

4,988,181

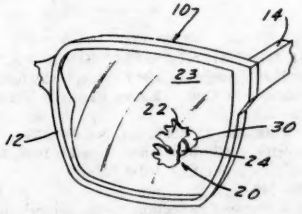
ORNAMENTAL DEVICE FOR EYEGLASSES

George Risch, Jr., 10424 Cary Cir., Cypress, Calif. 90630

Filed Apr. 16, 1990, Ser. No. 509,356

Int. Cl.[5] G02C *11/02*

U.S. Cl. 351—52 **12 Claims**



1. An ornamental device for mounting to one or both glass elements of a pair of eyeglasses, wherein said device comprises:

an ornament formed to be activated by means of a magnetic force, said ornament being positioned on the front surface

of at least one of the glass elements of a pair of eyeglasses; and

at least one magnet positioned on the rear surface of said glass element and positioned in alignment with said ornament mounted on the front surface of said glass element, whereby the magnetic force from said magnet holds said ornament in a selective position thereon.

4,988,182

OPHTHALMIC LENSES HAVING A PROGRESSIVELY VARIABLE REFRACTING POWER

Fumio Takahashi, Tone; Yasunori Ueno, Kawasaki, and Ryuji Aizawa, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,470

Claims priority, application Japan, Feb. 29, 1988, 63-47029

Int. Cl.[5] G02C *7/06*

U.S. Cl. 351—169 **6 Claims**

1. An ophthalmic lens having a progressively variable (refracting) refracting power, including:

a distance vision correction portion located in an upper portion of the lens along a predetermined principal meridional curve and having a refracting power corresponding to a far scene;

a near vision correction portion located in a lower portion of the lens and having a refracting power corresponding to a near scene;

an intermediate portion, defined between said distance vision correction portion and said near vision correction portion, for smoothly connecting the refracting powers of said distance vision and near vision correction portions,

wherein if a curvature along the principal meridional curve is given as ρm and a curvature in a direction perpendicular to the principal meridional curve is given as ρs, the curvatures ρm and ρs of the refracting surface along the principal meridional curve are substantially equal to each other at least from a lower position of said distance vision correction portion to a substantially center of said intermediate portion and satisfy condition $|\rho m - \rho s| \neq 0$ in the near vision correction portion, and the refracting surface on the principal meridional curve is formed so that the curvatures ρm and ρs are set to be maximum in an upper position in said near vision correction portion along the principal meridional curve and decreased toward a periphery of said near vision correction portion on the principal meridional curve.

4,988,183

EYE MOVEMENT INSPECTION DEVICE

Tatsuya Kasahara, Amagasaki, and Kyuichi Kishi, Kobe, both of Japan, assignors to Konan Camera Research Institute, Inc., Hyogo, Japan

Filed Jun. 12, 1989, Ser. No. 365,189

Claims priority, application Japan, Jun. 13, 1988, 63-145425

Int. Cl.[5] A61B *3/14*

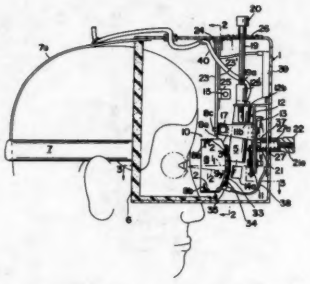
U.S. Cl. 351—210 **11 Claims**

1. An eye movement inspection device comprising:

goggles provided with an optical shutter which snugly fits on the head and face of a patient so as to prevent visible light from entering into the eyes of said patient and create a dark room in front of said eyes of said patient, said goggles being further provided with a head mounting means;

an infrared ray radiating means provided in said goggles so as to irradiate said eyes of said patient;

mobile eyepieces which are installed in said goggles and provided with infrared ray detecting television cameras and targets, said television cameras being for detecting and photographing infrared ray image of eye ball movement of said patient, and said targets being comprised of visible light sources which irradiate visible lights to said eyes of said patient;



an optical-axis adjustment device which movably supports said mobile eyepieces, said adjustment device being controllable by operating means provided outside of said goggles so that said mobile eyepieces in said goggles are adjustable in three directions that comprises a horizontal direction which is a direction of a width of eyes, a vertical direction which crosses at right angles with the direction of the width of eyes and a direction of ocular axis so that optical axes of said television cameras are toward eye balls of said patient.

4,988,184

OPHTHALMIC DISEASE DETECTION APPARATUS

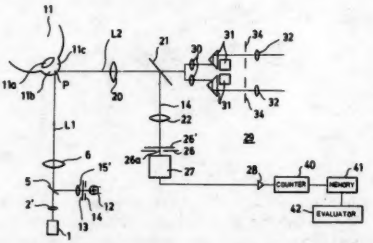
Koichi Akiyama, Tokyo, Japan, assignor to Kowa Company Ltd., Japan

Filed Jun. 14, 1988, Ser. No. 206,518

Claims priority, application Japan, Jun. 18, 1987, 62-150118

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—221 **13 Claims**



1. An apparatus for examining for the presence or absence of ophthalmic diseases in a patient's eye comprising:

a laser source for producing a laser beam;

a laser beam projector for projecting said laser beam;

means for focusing said laser beam at a selected spot in the patient's eye;

light receiving means including observation equipment for observing light scattered from said spot in the patient's eye and a photoelectrical converter for photoelectrically converting the scattered light in an electrical signal, said laser beam projector and light receiving means being arranged so that their optical axes cross substantially at

right angles to produce laterally scattered light which is formed almost entirely of polarized components perpendicular to the plane of incidence; and

means for processing said electrical signal to determine the presence or absence of ophthalmic diseases in the patient's eye;

wherein an optical element is provided in said light receiving means to divide the scattered light into said photoelectrical converter and said observation equipment, said optical element being arranged so that the optical axis of said scattered light directed towards said photoelectrical converter lies in a plane that includes the optical axes of said laser beam projector and said light receiving means so as to guide the polarized scattered light without changing the polarization thereof to the photoelectrical converter.

4,988,185

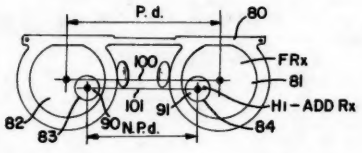
HIGH ADD BIFOCAL SPECTACLES AND METHODS OF PRESCRIBING

Richard E. Feinbloom, New York, N.Y., assignor to Designs for Vision, Inc., Ronkonkoma, N.Y.

Filed Oct. 5, 1988, Ser. No. 253,611

Int. Cl.[5] A61B *3/02, 3/04;* G02C *7/06*

U.S. Cl. 351—233 **17 Claims**



1. A method of prescribing the optical properties of bifocal spectacles to be worth by a person having reduced visual acuity to enable such person to utilize said spectacles for distant and near vision, comprising the steps of:

placing a trial frame on the face of said person as said person is viewing a distant object;

adjusting said trial frame as placed to determine the distant interpupillary distance between said persons eyes when viewing said distant object;

placing lenses in said trial frame to provide said person with a distant lens prescription indicative of optimum visual acuity for distant viewing by said person at said distant interpupillary distance;

placing a high add lens in said trial frame of a magnification value enabling said person to view text held at a nearer position than said distant object position;

adjusting said trial frame until said person can view said text binocularly at an adjusted near position indicative of a near interpupillary distance; and

recording data indicative of said near interpupillary distance together with said distant interpupillary distance together with said distant lens prescription together with said high add magnification value to enable the fabrication of said bifocal spectacles from said recorded data.

4,988,186

APPARATUS FOR QUANTIFYING VISUAL FUNCTION DEFECTS

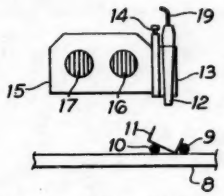
Adrian R. Hill, Brewers, Sheepstead, Abingdon, Oxon, OX13 6QG; Arthur E. Burgess, 105 Main Street, Fintry, Glasgow G63 OXE, and Barnaby C. Reeves, 72 St Mary's Road, Oxford, all of United Kingdom

Filed Jul. 25, 1988, Ser. No. 223,239

Claims priority, application United Kingdom, Nov. 25, 1986, 8628178

Int. Cl.[5] A61B *3/02*

U.S. Cl. 351—239 **19 Claims**



1. Apparatus for quantifying visual function defects, comprising:

a plurality of testing elements each having a surface provided with a selected visual stimulus; and with identification means comprising a machine readable code for uniquely identifying said selected visual stimulus;

means for reading said machine readable code on each element by passing said reading means over surfaces of said testing elements in any direction; and

microprocessing means adapted to analyze said machine readable code read by said reading means to quantify said visual function defects.

4,988,187

IMAGE PROJECTOR APPARATUS HAVING AUTOMATIC FOCUS CONTROL SYSTEM

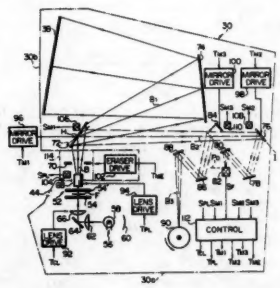
Masaaki Kuriyama, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 24, 1988, Ser. No. 211,449

Claims priority, application Japan, Jun. 26, 1987, 62-160435

Int. Cl.[5] G03B *3/00*

U.S. Cl. 353—101 **12 Claims**



1. In an optical apparatus wherein an image is to be focused onto a projection surface through a projection lens and wherein a focal state at a particular location of the projection surface is to be detected to move the projection lens on the basis of the result of detection of said focal state, a method of automatically controlling the focal point of said projection lens, comprising the steps of:

determining whether the focal state at said particular location of the projection surface can or cannot be detected,

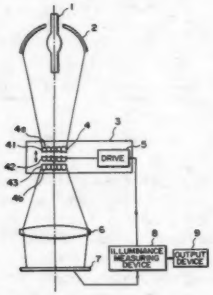
and when it is found that said focal state at said particular location of the projection surface cannot be detected, detecting a focal state at another location of the projection surface to move the projection lens with respect to the projection surface on the basis of the result of the detection at the other location.

4,988,188

ILLUMINATION DEVICE

Masakatsu Ohta, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,592
Claims priority, application Japan, Aug. 31, 1987, 62-218789
Int. Cl.[5] G03B *27/32*
U.S. Cl. 353—122 **13 Claims**



1. An illumination device, comprising:

a light source;

secondary light source forming means for forming predetermined secondary light sources by use of light from said light source, said secondary light source forming means including a plurality of lens array units arrayed in a direction of an optical axis, each lens array unit having a plurality of lens elements disposed along a plane orthogonal to the optical axis;

an optical arrangement for directing light beams from said secondary light sources to a surface to be illuminated, and for superposing the light beams one upon another on the surface to be illuminated; and

means for changing the positional relationship of said lens array units, in the direction of the optical axis, while maintaining a substantially constant refracting power of said secondary light source forming means, to thereby adjust the illuminance distribution on the surface to be illuminated.

4,988,189

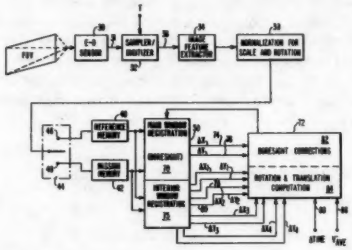
PASSIVE RANGING SYSTEM ESPECIALLY FOR USE WITH AN ELECTRO-OPTICAL IMAGING SYSTEM

Richard F. Kroupa, Lansdowne; Thomas J. Willett, Baltimore, and Glenn E. Tisdale, Severna Park, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 8, 1981, Ser. No. 309,864
Int. Cl.[5] G01C *3/08*
U.S. Cl. 356—4 **8 Claims**

1. In combination with an electro-optical (E-O) imaging system including: an image sensor which is transportable from one position to another position while maintaining substantially a common image scene in the field of view thereof and which is adapted to generate one and another frames of image information of said common scene corresponding to said one and another positions, respectively; and an image preprocessing means which includes: means for extracting from said one and another image frames image features representative of various objects in said common scene and for determining frame positions of said extracted image features within each frame with respect to a reference position of each frame; means for selecting at least a portion of each image frame to include a multiplicity of image features; and means for registering the extracted image features in the selected portions of said one and another frames in accordance with a predetermined matching criteria, the improvement of a passive ranging system comprising:

means for determining the changes in said frame positions of said common image features of the registered selected



portions of said one and another image frames with respect to their frame reference position; and

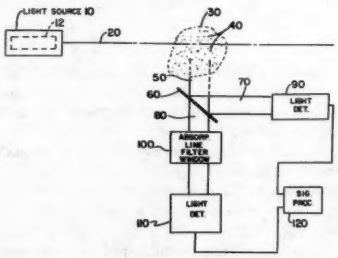
means for computing a range measurement from said image sensor to a vicinity of the image features in the selected image portions of the one and another frames as a function of the determined frame positional changes of said common image features thereof and said one and another image sensor positions with respect to said vicinity.

4,988,190

ABSORPTION LINE FILTER WINDOW AND METHOD FOR VELOCITY MEASUREMENTS BY LIGHT SCATTERING

Richard B. Miles, Princeton, N.J., assignor to Trustees of Princeton University, Princeton, N.J.

Continuation-in-part of Ser. No. 461,230, Jan. 5, 1990, abandoned. This application Sep. 11, 1990, Ser. No. 581,408
Int. Cl.[5] G01P *3/36*
U.S. Cl. 356—28 **53 Claims**



1. An apparatus for using light scattering for measuring the relative velocity between a source of light and a scattering region or volume located a distance in space from said source of light, wherein air molecules and/or particles within the scattering region or volume substantially provide scattering of the light, said apparatus comprising:

light source means for providing a beam of light of a predetermined frequency and linewidth, said beam being directed into a scattering region a distance from said light source means, for scattering said beam of light;

at least a first substantially non-linear absorption line filter window means positioned for receiving scattered light from said scattering region, and passing therethrough a substantial portion of the scattered light shifted in fre-

quency by the Doppler effect beyond the filter cutoff frequency;

a first light detector positioned relative to said filter window means, for receiving unabsorbed portions of said scattered light from said filter window means to provide a first output signal indicative of the scattering intensity of said unabsorbed scattered light;

light reference calibrator means for calibrating the said absorption filter window means, for providing a reference signal as a second output signal; and

signal processing means for receiving and comparing said second output signal to said first output signal, for providing an output signal proportional to the relative velocity between said light source means and said scattering region.

4,988,191

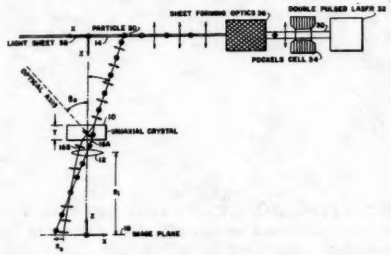
ELECTRO-OPTICAL METHOD AND SYSTEM FOR DETERMINING THE DIRECTION OF MOTION IN DOUBLE-EXPOSURE VELOCIMETRY BY SHIFTING AN OPTICAL IMAGE FIELD

Ronald J. Adrian, Champaign, and Christopher C. Landreth, Urbana, both of Ill., assignors to University of Illinois, Urbana, Ill.

Continuation-in-part of Ser. No. 23,773, Mar. 9, 1987, Pat. No. 4,866,639. This application Mar. 13, 1989, Ser. No. 322,114

Int. Cl.[5] G01P *3/36, 5/22*

U.S. Cl. 356—28 **8 Claims**



1. In a particle image velocimetry system in which respective image fields are created by accurately timed exposures involving first and second light pulses from a light source; and successive particle images, formed from light rays scattered from the particles, and resulting from seeding particles being displaced by the motion of a fluid, are recorded, such that the field velocity is inferred from the physical displacement of the respective image fields between the exposures, the improvement which comprises:

an arrangement for determining unambiguously the direction of displacement, and hence the sign of the velocity vector, said arrangement including a camera having a lens and an image plane, said camera being positioned to receive scattered light; and further including electro-optical means for artificially shifting the successive particle images a predetermined amount between exposures so that at least one vector component of all image displacements is positive even though corresponding components of physical displacements of the seeding particles may be negative;

said electro-optical means for artificially shifting comprising means providing that light scattered by the particles toward the camera from the second light pulse is linearly polarized 90 degrees with respect to light scattered toward the camera from the first light pulse, and means for displacing the rays of the light scattered toward the camera according to the polarization so that the image field of the second exposure is shifted with respect to the image field of the second exposure is shifted with respect to the image field of the first exposure;

said camera lens being interposed between said means for shifting and the image plane.

4,988,192

LASER THEODOLITE

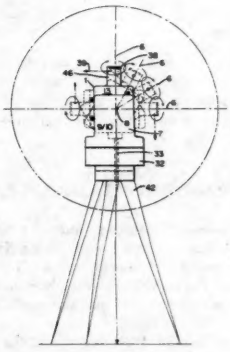
Ronald A. Knittel, Waechtersbachstr., Gross Umstadt, Fed. Rep. of Germany 6114

Filed Nov. 7, 1989, Ser. No. 432,492

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1988, 3838512

Int. Cl.[5] G01B *11/26;* **G01C** *1/02*

U.S. Cl. 356—138 **17 Claims**



1. A laser theodolite comprising:

carrier means (7) for rotatably supporting a laser (1), upon tilt bearing means (11, 12, 14), said laser (1) being rotatable about a tilt axis (8) through 360 degrees of rotation, said carrier means rotatably supported upon rotary bearing means (31–32) and rotatable about a vertical axis (30), said rotary bearing means (31–32) having a passage (33) disposed along said vertical axis (30) permitting light from said laser (1) to pass therethrough, means for measuring (2) and means for setting (3) the angular position of said laser about said tilt axis (8), means for measuring (4) and means for setting (5) the angular position of said carrier means (7) about said vertical axis (30), and a rotation prism (38) affixed to said laser (1) at an output aperture thereof for redirecting laser light output from said laser (1) towards a direction perpendicular to said light output.

4,988,193

METHOD AND APPARATUS FOR MEASURING INCIDENT LIGHT ANGLE RELATIVE TO LEVEL

Gary L. Cain, New Carlisle; Mark D. Sobottke, Kettering; Gerald H. Church, Huber Heights, and James T. Zalusky, Beavercreek, all of Ohio, assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Mar. 1, 1989, Ser. No. 317,512

Int. Cl.[5] G01C *1/00, 9/18;* **G01D** *5/36*

U.S. Cl. 356—152 **20 Claims**

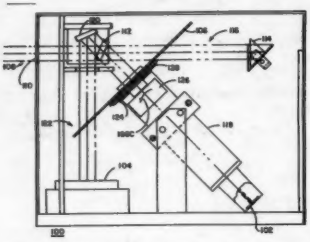
1. Apparatus for measuring the angle of incidence of a light beam or plane relative to level comprising:

photodetector means for sensing said light beam or plane and generating signals representative thereof;

first mirror means for defining a gravitationally level reflective surface;

optical means for transmitting a first portion of said light beam or plane to said photodetector means in alignment with said angle of incidence as aligned light, and a second portion of said light beam or plane to said first mirror means and after reflection therefrom to said photodetector means as reflected light;

discriminating means for separating aligned light transmitted to said photodetector means from reflected light transmitted to said photodetector means such that distinct signals



representative of aligned light and reflected light are generated by said photodetector means; and

control means for processing said distinct signals to determine the angle of incidence of said light.

4,988,194

OPTICAL STORAGE INSPECTION UNIT CALIBRATION DISK

Shigeji Hara; Takashi Yoshizawa, both of Musashino; Kanae Kinoshita, Yokohama; Masahiko Sakamoto, Kyoto; Mitsuhiro Terada, Kyoto, and Youji Suzuki, Kyoto, all of Japan, assignors to Kyocera Corporation, Kyoto; Nippon Telegraph and Telephone Corporation, Tokyo and Shindenshikogyo Corporation, Kanagawa, all of, Japan

Filed Jun. 23, 1988, Ser. No. 210,243

Claims priority, application Japan, Jul. 7, 1987, 62-170272

Int. Cl.[5] G01J *1/02*

U.S. Cl. 356—243 **7 Claims**

1. A rotatable calibration disk used for correction of an optical disk inspection unit for optical disks having a recording layer, comprising at least one of two correction sections: an axial displacement correction section, formed concentric to a center of rotation of said calibration disk, which has a center correction plane with a predetermined reflectivity value at a height in level with the recording layer of an optical disk, and from around said center correction plane a plurality of correction planes with a predetermined difference in level between two adjacent planes; and a focus error output voltage correction section, formed concentric to said center of rotation at said height in level with said recording layer of said optical disk, and having a surface inclined at a predetermined angle along the radial direction of said calibration disk.

4,988,195

INTERNAL REFLECTANCE APPARATUS AND METHOD USING CYLINDRICAL ELEMENTS

Walter M. Doyle, Laguna Beach, Calif., assignor to Axiom Analytical, Inc., Laguna Beach, Calif.

Filed Feb. 17, 1989, Ser. No. 312,130

Int. Cl.[5] G01N *21/01*

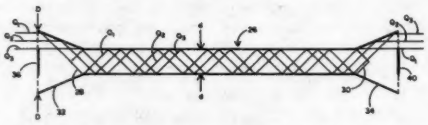
U.S. Cl. 356—244 **24 Claims**

1. An optical system, for use in analyzing fluids by means of attenuated total reflection, in which an internally reflecting element extends into a fluid whose radiation absorption is to be measured, comprising:

a small diameter cylindrical cross-section internally reflecting element, inside which radiation travels generally longitudinally as it is reflected back and forth across the diameter of the element;

a convex conical surface on the radiation entering end of the internally reflecting element;

a mirror for reflecting incoming radiation into the entering end of the internally reflecting element;



the mirror having a concave conical reflecting surface, the smaller diameter end of which is adjacent to the entering end of the internally reflecting element;

means for directing a radiation beam into the larger diameter end of the mirror;

the maximum diameter of the mirror being too small to accept incoming rays which would be reflected more than once by the mirror on their way to the entering end of the internally reflecting element; and

means near the entering end of the internally reflecting element for blocking rays which would otherwise enter that element without being reflected by the mirror.

4,988,196

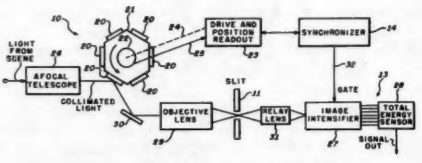
TIME DOMAIN FRAUNHOFER LINE DISCRIMINATOR

Lawrence H. Gilligan, Charlottesville, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed Apr. 17, 1989, Ser. No. 338,696

Int. Cl.[5] G01N *21/64;* **G01J** *3/18*

U.S. Cl. 356—308 **19 Claims**



1. Apparatus for detecting low level light emanations masked in sunlight, said sunlight with said emanations having a spectrum, said spectrum including at least one Fraunhofer line, comprising:

a slit,

spreading means for spatially spreading said spectrum of said sunlight with said emanations,

scanning means for scanning said spread spectrum with respect to said slit,

gated sensor means responsive to light passing through said slit from said scanned spread spectrum, and

gating means for gating said gated sensor means when said Fraunhofer line is coincident with said slit so that said gated sensor means can sense a spectral component of said masked light emanations corresponding to said Fraunhofer line passing through said slit.

4,988,197

METHOD AND APPARATUS FOR ALIGNING TWO OBJECTS, AND METHOD AND APPARATUS FOR PROVIDING A DESIRED GAP BETWEEN TWO OBJECTS

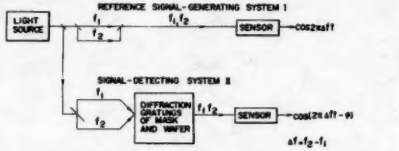
Yoriyuki Ishibashi, Yokohama; Ryoichi Hirano, Tokyo, and Kyoji Yamashita, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 28, 1988, Ser. No. 291,276

Claims priority, application Japan, Dec. 28, 1987, 62-334716; Dec. 28, 1987, 62-334774; Mar. 31, 1988, 63-78864; Sep. 30, 1988, 63-243810

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—349 **139 Claims**



1. A method of aligning first and second objects opposing each other, the first and second objects having first and second diffraction gratings, respectively, said method comprising the steps of:

emitting first and second light beams of different frequencies;

making the first and second light beams incident on the first and second diffraction gratings, thereby obtaining at least twice diffracted light beams interfering with each other;

detecting a beat generated in the twice diffracted light beams;

generating third and fourth light beams having the same frequencies as the first and second light beams, being in phase with the first and second light beams, respectively, and interfering with each other, and thereby obtaining a reference beat;

calculating a phase difference of the detected beat with respect to the reference beat, thereby obtaining a phase shift which corresponds to a displacement between the first and second objects; and

aligning the first and second objects in accordance with the displacement.

4,988,198

METHOD AND APPARATUS FOR MEASURING MICROLEVEL DIFFERENCE

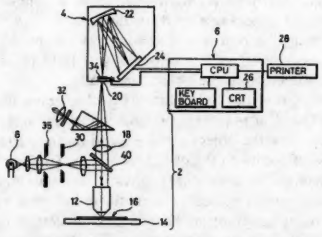
Noriyuki Kondo, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Jun. 22, 1988, Ser. No. 210,033

Claims priority, application Japan, Jun. 22, 1987, 62-155125

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—357 **2 Claims**



1. An apparatus for measuring the distance between an upper surface and a lower surface of a sample, said apparatus comprising:

means for holding said sample;

a light source for illuminating said upper and lower surfaces in such a manner that light is reflected off of said surfaces, said light source impinging light substantially vertically onto said upper surface, said reflected light having a first component which is regularly reflected from said upper surface and a second component which represents interfered light reflected from said upper and lower surfaces;

an optical system for condensing said reflected light, said optical system including an optical axis;

reducing means for reducing said first component relative to said second component, said reducing means including means for intercepting said first component near said optical axis, said intercepting means including a mirror which includes:

(1) a central portion and other portions;

(2) a light intercepting portion formed at said central portion; and

(3) transmissive portions formed at said other portions;

a spectroscope for analyzing reflected light condensed by said optical system; and

means for detecting spectrum of light analyzed by said spectroscope.

4,988,199

METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF OPTICALLY ACTIVE SUBSTANCES

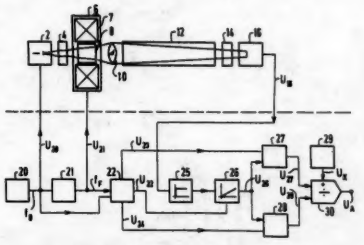
Bernt-Joachim Paul, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jul. 19, 1989, Ser. No. 382,841

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824589

Int. Cl.[5] G01N *21/21*

U.S. Cl. 356—368 **38 Claims**



1. In a system including a light source, a modulator operated at a predetermined modulation frequency, an analyzer and a detector, a method for measuring the concentration of optically active substances comprising the steps of:

(a) measuring with said detector the polarization of light fed through said substances to produce an output signal;

(b) alternately integrating the output signal from the detector, during each half period of said modulation frequency, to first and second voltage values, respectively;

(c) storing said first and second voltage values;

(d) forming a quotient from the first and second stored voltage values; and

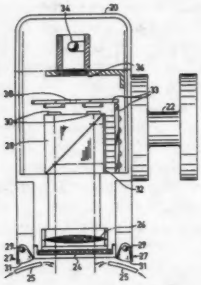
(e) subtracting an adjustable constant voltage from said quotient.

4,988,200

APPARATUS FOR AUTOMATIC TRACKING AND CONTOUR MEASUREMENT

Yael L. Cohen-Sabban, Yahud, Israel, assignor to Israel Aircraft Industries, Ltd., Lod, Israel

Filed May 10, 1988, Ser. No. 192,269
Claims priority, application Israel, May 18, 1987, 82569
Int. Cl.[5] G01B *11/24*
U.S. Cl. 356—376 **14 Claims**



1. Apparatus for automatic tracking and contour measurement comprising;

a CNC machining head; and

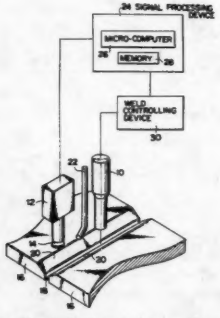
electro-optical sensing means comprising a staring detector array mounted on said CNC machining head for directly providing without coordinate transformation an output indication of contours of an object and for providing signal for commanding said CNC machine head to move along the contours all in the precise frame of reference of said CNC machining head.

4,988,201

APPARATUS FOR DETECTING A SHAPE OF A GROOVE

Yuji Sugitani; Yoshihiro Kanjo, and Takanori Nishimura, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 242,345
Int. Cl.[5] G01B *11/24*
U.S. Cl. 356—376 **8 Claims**



1. An apparatus for detecting a shape of a groove, comprising:

means for forming picture images of a groove and a groove face of a work piece of metal to be welded using a welding arc as illuminating light, said picture images each including a plurality of picture elements;

storage means for storing information corresponding to picture elements of the picture images formed by said means for forming picture images, said information being constituted in two dimensions;

integrating means for integrating the information corresponding to the picture elements stored in said storage means in a predetermined direction of a memory in said storage means;

differentiating means for differentiating the integrated information in a direction substantially perpendicular to the predetermined direction of the memory; and

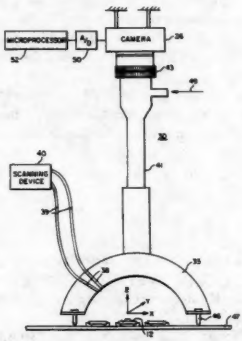
detecting means for detecting information on shapes of the groove and groove face on the basis of the differentiated information on the picture elements.

4,988,202

SOLDER JOINT INSPECTION SYSTEM AND METHOD

Shree K. Nayar, Pittsburgh, Pa.; Arthur C. Sanderson, Williamstown, Mass.; Lee E. Weiss, and David A. Simon, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 28, 1989, Ser. No. 372,481
Int. Cl.[5] G01B *11/24*
U.S. Cl. 356—394 **16 Claims**



1. A method for inspecting an object having a specular surface comprising the steps of:

(a) projecting sequentially toward the object the light from each of a plurality of point light sources which are arranged in a fixed configuration about a common site at which the object is placed for inspection;

(b) viewing the object at the common site to detect light patterns caused by the reflections of light of each point light source from the object surface;

(c) interpreting the light patterns to determine the surface orientation of points on the object surface; and

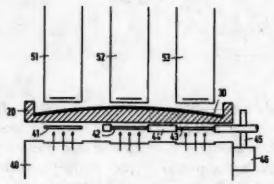
(d) evaluating the object surface based on the surface orientation of points on the object surface by (i) mapping, with knowledge of the object surface orientation, the unit surface normal at each point on the object onto a Gaussian sphere to generate an Extended Gaussian image of the object and (ii) comparing the object Extended Gaussian image with the Extended Gaussian image of at least one acceptable object.

4,988,203

DEVICE FOR INSPECTING AN INTERFERENCE FILTER FOR A PROJECTION TELEVISION DISPLAY TUBE

Leendert Vriens, and Maurits R. T. Smits, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 28, 1989, Ser. No. 329,915
Claims priority, application Netherlands, Jan. 12, 1989, 8900070
Int. Cl.[5] G01N *21/00*
U.S. Cl. 356—402 20 Claims



1. A device for inspecting an interference filter for a projection television display tube, which device comprises:

at least one first light source for generating a first light beam which propagates along a first light path,

means for positioning the interference filter in the first light path,

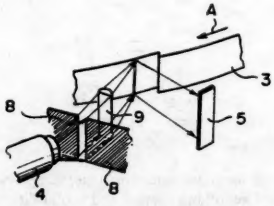
means for obtaining a spectral distribution in the first light beam, which spectral distribution has a gradient in a wavelength range within which a desired cut-off wavelength of the interference filter is located, and at least one first detector for measuring the intensity of the first light beam after it has traversed the interference filter or has been reflected thereby.

4,988,204

JOINT INSPECTION APPARATUS

Masaaki Sakaguchi; Kazuo Kubota, and Fusao Ichikawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 27, 1988, Ser. No. 211,644
Claims priority, application Japan, Jul. 2, 1987, 62-166028
Int. Cl.[5] G01N *21/89*
U.S. Cl. 356—430 6 Claims



1. A joint inspection apparatus comprising:

(i) a light irradiating means for irradiating light to a tape joint at which two tape edge portions are joined together,

(ii) a light receiving means for receiving the light irradiated by said light irradiating means to said tape joint and passing through said tape joint or reflected by said tape joint, and

(iii) a judgment means for judging the extent of a deviation of said two tape edge portions from each other in the tape width direction at said tape joint on the basis of information on the optical amount of the light received by said light receiving means on both sides of said tape joint.

4,988,205

REFLECTOMETERS

Keith A. Snail, Washington, D.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 106,469, Oct. 9, 1987, Pat. No. 4,815,858.
This application Jan. 17, 1989, Ser. No. 297,648
Int. Cl.[5] G01N *21/47*
U.S. Cl. 356—446 7 Claims

1. A method of measuring diffuse reflectance of radiation by a sample, comprising the steps of:

arranging a first mirror having a concave reflective surface, a second mirror having a rotationally symmetric contour defining a tapered reflective surface around a cavity as provided by a compound parabolic concentrator (CPC) device and a detector into a system with the mirrors located in a particular relation to the sample and the detector;

irradiating the second mirror and using the second mirror to direct radiation to the first mirror while using the first mirror to collect the radiation and to focus the collected radiation onto the sample in a Lambertian manner, whereupon the sample diffusely reflects a fraction of the radiation from the sample; and

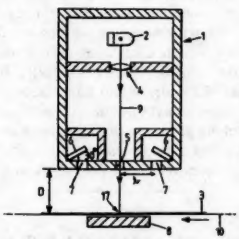
detecting radiation diffusely reflected by the sample onto the detector to obtain a measurement of the sample's diffuse reflectance of the radiation that was directed onto the sample by the first mirror.

4,988,206

METHODS ARE APPARATUS FOR MONITORING THE DIFFUSE REFLECTIVITY OF A SURFACE

Derek A. Melleney, Wiltshire; David C. Reeves, and Michael Potter, both of Hampshire, all of England, assignors to De La Rue Systems Limited, London, England

PCT No. PCT/GB87/00474, § 371 Date Apr. 26, 1988, § 102(e) Date Apr. 26, 1988, PCT Pub. No. WO88/00338, PCT Pub. Date Jan. 14, 1988
PCT Filed Jul. 6, 1987, Ser. No. 165,196
Claims priority, application United Kingdom, Jul. 4, 1986, 8616334
Int. Cl.[5] G01N *21/47*
U.S. Cl. 356—446 17 Claims



1. A method of monitoring the diffuse reflectivity of a portion of a surface (3), the method comprising:

exposing the surface portion to a beam of radiation (9);

sensing the intensity of a part of the diffuse radiation, reflected by the surface portion, at two sensing positions situated such that the intensity of the diffusely reflected radiation, sensed at each sensing position, is substantially invariant within a working range of distances (D) between the sensing position and the surface portion, the size and position of the surface portion within the plane of the surface being substantially constant within the working range of distances; and

determining from each sensed intensity a value representative of the diffuse reflectivity of the surface portion;

the method further comprising:

arranging the sensing positions in symmetrical locations to either side of the beam of radiation; and

averaging the intensities sensed at the sensing positions to obtain a diffuse reflectivity value for the surface portion which is substantially invariant to folds and creases in the surface portion.

4,988,207

DRYING/COATING DRUM FOR THE PREPARATION OF BITUMINOUS COATED PRODUCTS, COMPRISING AN IMPROVED BURNER

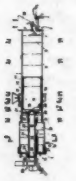
Guy Marconnet, Rive de Gier, France, assignor to Ermont C. M., Lorette, France

Filed Apr. 3, 1990, Ser. No. 503,862

Claims priority, application France, Apr. 5, 1989, 89 04475

Int. Cl.[5] B28C *5/46*

U.S. Cl. 366—25 9 Claims



1. A drying and coating drum for the preparation of bituminous coated products from aggregates and bitumen, the drum having a casing (1) of cylindrical form comprising a first end (2), or intake end, via which at least part of the aggregates are introduced, and a second end (3), or discharge end, via which the body (19) of a burner (20) penetrates into the drum in its axial direction up to a zone which is distant from the discharge end (3) so as to develop a flame; (14) and to circulate hot gases along the drum, in the direction opposite to the direction of circulation of the aggregates, from the end (19*a*) of the body (19) of the burner, a means (31) for injecting bitumen disposed so as to emerge in a coating zone (30) of the drum located around the body (19) of the burner (20) and means for rotating the drum about its axis (5), wherein the part of the body (19) of the burner (20) located inside the drum is disposed coaxially inside an outer peripheral sleeve (22), free in rotation about the body (19) of the burner and connected to the casing (1) of the drum, one end of which, corresponding to the end of the burner (20) from which the flame (14) develops, carries a plurality of blades (25, 26) which are radially directed relative to the casing (1) of the drum and have faces which are tilted relative to the longitudinal direction (5) of the drum and form a turbine for sucking gas in the direction from the second to the first end of the drum during rotation of the drum and a screen against radiation from the flame (14) of the burner (20).

4,988,208

METHOD OF AND APPARATUS FOR MIXING OR DISPERSING PARTICLES

Akira Shibuya, Tokyo; Michio Aoyama, Kitakyushui, and Isao Kimura, Tokyo, all of Japan, assignors to Koshin Kenki Kogyo Co., Ltd., Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 252,248

Claims priority, application Japan, Oct. 8, 1987, 62-252333; Mar. 30, 1988, 63-74565

Int. Cl.[5] B01F *11/00*

U.S. Cl. 366—108 11 Claims

1. A method of mixing particles, comprising the steps of:

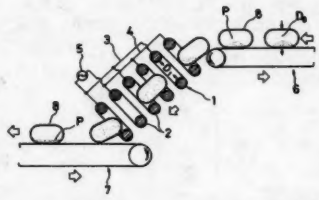
putting particles to be mixed in a dielectric container;

bringing said dielectric container into the area of influence of an electrode assembly for forming an electric field curtain sufficient to electrify the particles; and,

allowing the particles in the container to contact the container in said area of influence so as to mix the electrified particles.

7. An apparatus for mixing particles comprising:

a dielectric container for accommodating particles to be mixed;



an electrode assembly for forming an electric field curtain, said assembly being formed to have an inner diameter larger than an outer diameter of said dielectric container and including a plurality rod shaped electrodes spaced apart from each other at equal intervals; and

a power supply for applying AC high voltage to respective electrode of said electrode assembly.

4,988,209

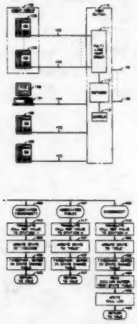
TELEPHONE AGENT MANAGEMENT INFORMATION SYSTEM

Wayne A. Davidson, Winfield, and Sahadat Hossain, Batavia, both of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 29, 1988, Ser. No. 291,814

Int. Cl.[5] H04M *11/00*

U.S. Cl. 370—58.2 14 Claims



1. A management information generating system for use with an ISDN switching system and a plurality of telephone agent stations connected to said switching system, and comprising:

computer means comprising means connected to said switching system via an ISDN subscriber line for receiving digital messages from said switching system corresponding to digital call handling messages transmitted between said system and said stations via subscriber lines other than said ISDN subscriber line connected to said computer means; and

said computer means further comprising means responsive to said digital messages for generating information defining past activities of said stations.

4,988,210

METHOD AND APPARATUS FOR DETECTING DEFECTIVE PORTION ON OUTER SURFACE OF PIPE

Toshio Koshihara; Koji Ishihara; Toru Hirashima; Shunichiro Ishida; Haruhito Okamoto, and Yuji Matoba, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,977

Claims priority, application Japan, Mar. 18, 1988, 63-64819

The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.

Int. Cl.[5] G01N *25/72*; G01M *3/00*

U.S. Cl. 374—5 14 Claims

1. A method for detecting a defective portion on the outer surface not exposed of a pipe, comprising the steps of

imparting a temperature change to a pipe from the side of the inner surface thereof so that a difference in temperature is produced between a portion of the inner surface of said pipe corresponding to a defective portion on the outer surface not exposed of said pipe and a portion of the inner surface of said pipe corresponding to a normal portion of the outer surface of said pipe; then shooting the inner surface of said pipe by means of a thermal imaging system while said difference in temperature still remains on the inner surface of said pipe to obtain a thermal image of said difference in temperature; and detecting said defective portion on the outer surface of said pipe by means of the thus obtained thermal image.

4,988,211

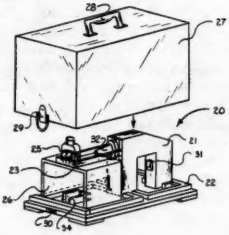
PROCESS AND APPARATUS FOR CONTACTLESS MEASUREMENT OF SAMPLE TEMPERATURE

Sharon J. Barnes; James W. Beutnagel; Russel T. Mack, all of Lake Jackson; Aaron A. Mills, Sweeny, and John Smith, III, Freeport, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 27, 1989, Ser. No. 344,326

Int. Cl.[5] G01J *5/02*; G01F *15/02*

U.S. Cl. 374—121 6 Claims



1. A process for determining the temperature of a human body fluid sample or food product sample comprising:

(a) placing a sample, contained in a sample holder, a predetermined distance away from, and in the focal path of, an infrared temperature detecting means having a close focus means; and

(b) detecting said temperature of said human body fluid sample or food product sample with said temperature detecting means without contacting the sample by measuring the infrared rays emitting from said sample, and reading the temperature on an L.E.D. display which is actuated by the infrared detecting means.

said infrared detecting means having been calibrated to take into account the emissivity values of the said sample and sample holder whereby the reading on the L.E.D. display reflects the calibrated emissivity value.

4,988,212

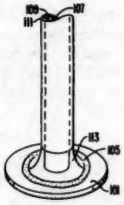
FIBEROPTIC SENSING OF TEMPERATURE AND/OR OTHER PHYSICAL PARAMETERS

Mei H. Sun, Los Altos; Kenneth A. Wickersheim, Menlo Park, and Stanley O. Heinemann, Irvine, all of Calif., assignors to Luxtron Corporation, Mountain View, Calif.

Division of Ser. No. 164,130, Mar. 4, 1988, Pat. No. 4,883,354, which is a division of Ser. No. 921,637, Oct. 22, 1986, Pat. No. 4,752,141, which is a continuation-in-part of Ser. No. 791,223, Oct. 25, 1985, abandoned. This application Aug. 22, 1989, Ser. No. 396,996

Int. Cl.[5] G01K *11/20*

U.S. Cl. 374—161 4 Claims



1. An optical sensor held at an end of an optical fiber and especially adapted for measuring temperature of a surface, comprising:

a thin, rigid, flat and round disc of sapphire having two sides,

a layer of luminescent material carried by one side of said disc, and

means on said one side of said disc holding the disc substantially orthogonal with said optical fiber end for providing optical coupling between said luminescent material and the fiber end and for allowing some tilting of the fiber with respect to the disk,

whereby the temperature of the surface may be measured by positioning against said surface the side of the disk opposite the luminescent material layer.

4,988,213

PACKING BAG MADE FROM A FILM TUBE

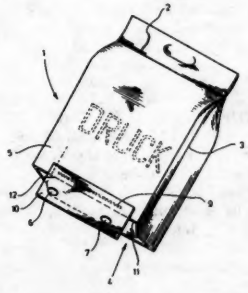
Helmut Mattle, Gronau, Fed. Rep. of Germany, assignor to M & W Verpackungen Mildenberger & Willing GmbH & Co., Gronau, Fed. Rep. of Germany

Filed Jun. 19, 1989, Ser. No. 367,941

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 8807896[U]

Int. Cl.[5] B65D *33/14*

U.S. Cl. 383—6 4 Claims



1. A packing bag comprising:

tubular material cut to lengths with an open end for filling purposes, which at its open end carries at least one film tab with at least one wicket perforation, the bag having an

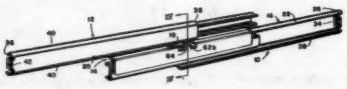
outer flat top side and having bottom material, said tab being connected to the outer flat side of the bag at tis open end, the bag being made of a film and having inside folded lateral walls, the bag having a weld seam at the outer flat side of the bag near its open end and the tab being made of the same material as the bag and being connected to the outer flat side of the bag, the tab having an additional score line which is situated between the weld seam and the wicket perforation, where parts of the tab which remain with the bag after it is removed or torn off of a wicket can be combined with the bottom material of the bag during closing once the bag is filled.

4,988,214

SEQUENTIAL DRAWER SLIDE

Gene R. Clement, Grandville, Mich., assignor to Knape & Vogt Manufacturing Co., Grand Rapids, Mich.

Filed Aug. 18, 1986, Ser. No. 897,779
Int. Cl.[5] A47B *88/04*; F16C *29/04*
U.S. Cl. 384—18 **28 Claims**



1. A sequential drawer slide comprising:
a cabinet slide member;
an intermediate slide member mounted for linear movement with respect to said cabinet slide member between extended and retracted positions;
a drawer slide member mounted for linear movement with respect to said intermediate slide member between extended and retracted positions; and
sequencing means for sequencing the operation of said slide members so that only one of said cabinet and drawer slide members is permitted to move with respect to said intermediate slide member at any given position of said slide members, said sequencing means including a control lever member shiftably supported by said intermediate slide member between first and second positions, said sequencing means further including first and second engagement means on said drawer and cabinet slide members, respectively, said control lever member coacting with said first engagement means when in the first position and with said second engagement means when in the second position to aid in interlocking said intermediate slide member with the one of said cabinet and drawer slide members carrying the coacting engagement means, said control lever member being shiftable between the first and second positions when said intermediate rail is in its extended position and said drawer rail is in its retracted position.

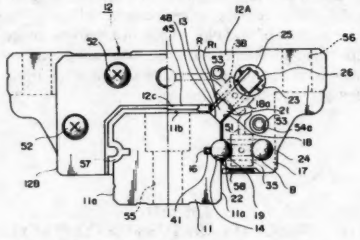
4,988,215

LINEAR GUIDE APPARATUS USING A COMBINATION OF BALLS AND ROLLERS

Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1990, Ser. No. 516,242
Claims priority, application Japan, May 1, 1989, 59-112605
Int. Cl.[5] F16C *29/06*
U.S. Cl. 384—44 **4 Claims**

1. A linear guide apparatus using a combination of balls and rollers comprising:
an axially extending guide rail having a pair of axial roller raceway surfaces respectively formed in boundary edges between an upper surface and both lateral side surfaces, the guide rail having a pair of axial ball rolling grooves respectively formed in both of the lateral side surfaces in parallel with the roller raceway surfaces;
a slider main body movably straddling said guide rail in an axial direction and having a pair of roller rolling grooves formed in an inner surface respectively opposing the roller raceway surfaces, said slider main body having a pair of ball rolling grooves formed in the inner surface respectively opposing the ball rolling grooves of said guide rail, said slider main body further having ball return paths formed in a thick wall portion respectively in parallel with the ball rolling grooves and having roller return paths formed in a thick wall portion respectively in parallel with the roller rolling grooves;
a pair of end caps respectively joined to opposite ends of said slider main body, each of said end caps having a first pair of curved paths, each communicating corresponding ones of the ball return path and the ball rolling groove with each other, and having a second pair of curved paths, each communicating corresponding ones of the roller return path and the roller rolling groove with each other;



a plurality of balls rollably and circulatingly inserted in the opposing ball rolling grooves, the ball return paths, and the first curved paths;
a plurality of rollers rollably and circulatingly inserted in the roller rolling grooves, the roller return paths, and the second curved paths; and
a roller retainer having a rectangular frame shape for retaining the rollers in the roller rolling grooves of said slider main body, said roller retainer having roller retaining surfaces formed on outer side surfaces of longitudinal legs thereof and having holding and supporting sections protruding axially and outwardly from lateral legs thereof, said roller retainer being disposed in a space between the upper surface of said guide rail and an opposing inner surface of said slider main body by being held and supported by said end caps with the holding and supporting sections fitted into supporting holes respectively formed in said end caps so that said roller retainer retains the rollers in the roller rolling grooves with the roller retaining surfaces of the longitudinal legs abutting against chamfered surfaces of the rollers.

4,988,216

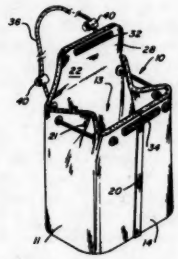
INSULATED CONTAINER INSERTABLE INTO A BACKPACK

Philip C. Lyman, 4645 Macky Way, Boulder, Colo. 80303

Filed Apr. 21, 1989, Ser. No. 341,537
Int. Cl.[5] B65D *30/20, 30/02, 33/28*
U.S. Cl. 383—74 **1 Claim**

1. A thermal container for insertion into an outer carrying case, comprising in combination:
a body formed of insulating and waterproof material having a predetermined open shape and a predetermined closed shape, said open shape having a top opening for receiving carried items, said body having an integral flap which is selectively closed over said opening by attachment means for holding said flap in position over said top opening to define said closed position, and sealing means which selec-

tively tightens the closure of said top opening by deforming said container along deformation lines formed in said body, said sealing means further including a drawstring slideable through openings formed in said body near said top opening, said drawstring having a pair of knotted ends



on one side of said second openings and stops selectively slideable along said drawstring, whereby sliding said stops into position against said flap and said knotted ends against said second openings seal said top opening into said closed position.

4,988,217

WRAPPED BUSH

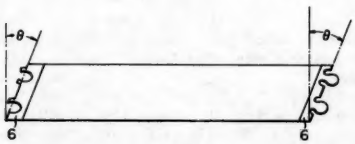
Yoshio Iijima, Nagoya, Japan, assignor to Daido Metals Company Ltd., Nagoya, Japan

Continuation of Ser. No. 715,480, Mar. 25, 1985, abandoned. This application Jun. 5, 1986, Ser. No. 873,441

Claims priority, application Japan, Mar. 27, 1984, 59-58856

Int. Cl.[5] F16C *17/02*

U.S. Cl. 384—273 **2 Claims**



1. A cylindrical wrapped bearing bush wherein opposed edges of the wrapped bush are connected to form a joint;

said joint extending over the entire width of the bush on a step-wise, slanted manner with respect to a generatrix on the outer peripheral surface of the bush;

wherein each of the opposed edges has a number of right-angled steps which are disposed in a slanted manner with respect to the generatrix.

4,988,218

THRUST BEARING FOR A PRESSURIZED LUBRICATING SYSTEM AND AN O-RING

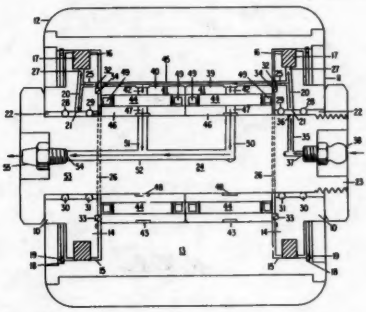
Lawrence D. Quaglia, 917 Quincy Ave., Bronx, N.Y. 10465

Filed Nov. 2, 1988, Ser. No. 266,086

Int. Cl.[5] F16C *33/10, 33/66*

U.S. Cl. 384—322 **17 Claims**

1. A thrust bearing for a pressurized lubricating system, said thrust bearing including a body, said body adapted to be engaged at hub means in said lubricating system, said body adapted to be sealed against outflow of lubricant at said hub means, said body further adapted to be engaged at shaft means in said lubricating system, said body including an opening adapted to receive said shaft means therethrough, said body adapted to be sealed against outflow of lubricant at said shaft means, and said body adapted to be retained in said lubricating system, said shaft means seal against outflow of lubricant includes a pair of O-rings, a pair of circumferential grooves in said body opening adapted to receive said shaft means, said pair of shaft means seal O-rings are adapted to fit in said grooves, said body includes at least one passage therethrough, said at least one passage therethrough adapted to guide lubri-



cant either to or from said shaft means, said at least one passage therethrough open at one end between said shaft seal means O-rings.

4,988,219

ROLLER BEARING ASSEMBLY WITH SENSOR DEVICE

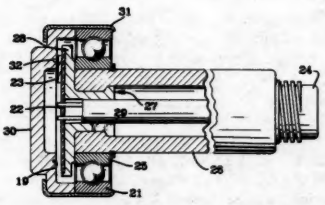
Fernand Peilloud, Hery sur Alby, France, assignor to The Torrington Company, Torrington, Conn.

Continuation of Ser. No. 292,857, Jan. 3, 1989, abandoned. This application May 22, 1990, Ser. No. 527,681

Claims priority, application France, Jan. 28, 1988, 88 01034

Int. Cl.[5] F16C *33/30;* **G01D** *3/48*

U.S. Cl. 384—448 **9 Claims**



1. A bearing assembly with a sensor device, said assembly comprising:

a first ring having a bore defining an inner diameter;

a second ring having a bore and also having an outside diameter smaller than the inner diameter of the first ring, said second ring being radially aligned with the first ring;

one of said rings being fixed and the other of said rings being rotatable;

multiple rolling elements between said fixed and rotating rings;

a stationary sensing disk connected to the fixed ring and having a sensing element mounted on a face of said sensing disk;

a rotatable coding disk connected to the rotatable ring and having a coding element located on a face of said coding disk and in proximity to said sensing disk so that said coding element rotates in proximity to said sensing element; and

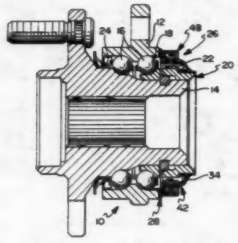
one of said sensing and coding disks having a hub extending axially into the second ring bore, the hub having a cylindrical bearing surface coaxial to and radially coplanar with said rings.

4,988,220

SERVICABLE WHEEL SPEED SENSOR ASSEMBLY

Paul J. Christiansen, Sandusky, and David A. Foster, Castalia, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 14, 1990, Ser. No. 522,697
Int. Cl.[5] F16C *19/52*; G01P *3/48*; H02K *21/38*
U.S. Cl. 384—448 3 Claims



1. For use in a vehicle bearing having a fixed bearing race and a coaxial rotating race defining an annular space therebetween, and in which said rotating race has a cylindrical array of axially extending portions of magnetic material, a combined seal and speed sensor assembly, comprising,

a seal casing mounted to said fixed race and enclosing said annular space, said seal having an axially extending cylindrical wall of magnetic material radially spaced from said portions, said wall also having a circular array of openings cut therethrough so as to form a matching array of fingers overlying said portions,

a non-magnetic elastomer sleeve molded to the outside of said seal casing wall overlying said fingers so as to fill in said openings, said sleeve having an outer diameter closely matching that of said cylindrical casing wall, and,

a ring-shaped speed sensor having an inner diameter slightly less than said sleeve,

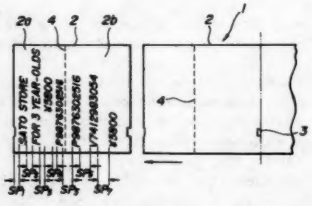
whereby, said sensor may be pushed axially over said sleeve making a snug fit therewith and overlying said fingers and portions, and may also be axially removed from said sleeve while still leaving said annular space enclosed.

4,988,221

SPECIFIC DATA INPUT ORDER FOR CONTINUOUS STRIPS OF TAGS INCLUDING LINE SPACING AMOUNT

Tooru Shibayama, Kanagawa; Tadashi Watanabe, Tokyo, and Mitsuharu Takahashi, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Sato, Japan

Continuation of Ser. No. 211,135, Jun. 22, 1988, abandoned, which is a continuation of Ser. No. 524,128, Aug. 16, 1983, abandoned. This application Jan. 5, 1990, Ser. No. 463,866
Claims priority, application Japan, Aug. 17, 1982, 57-141632
Int. Cl.[5] B41J *5/30*
U.S. Cl. 400—61 11 Claims



1. A printing device for printing a continuous strip of tags comprising a set of tags, said device comprising:

(a) a feed mechanism and a printing mechanism for feeding and printing the continuous strip of tags;

(b) data memory means;

(c) input means for receiving input printing data in a predetermined format; determining therefrom, as a function of said format, printing data specifying the printing of said set of tags; and storing said printing data in said data memory means; wherein said input means requires said format of said input printing data, for said set of tags to be printed, to consist, in this order, of:

(1) a start signal;

(2) character data CD specifying characters for at least two lines to be printed on each tag in said set of tags;

(3) at least two line spacing data values SD corresponding to said character data CD, said line spacing data values SD specifying the respective locations at which said lines are to be printed on each tag in said set of tags;

(4) a tag number data value ND specifying the number of tags in said set of tags to be printed; and

(5) an end signal;

(d) a controller responsive to said data memory means which retrieves from said data memory means said input printing data for said set of tags to be printed and then prints said set of tags;

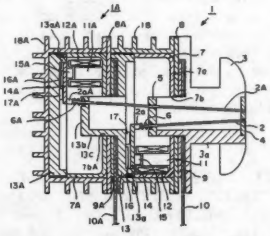
wherein said controller retrieves said start signal; said character data CD, said line spacing data values SD, said tag number data values ND; and said end signal from said data memory means, and controls said feed mechanism and said printing mechanism to print said set of tags so that the respective location of each said data line on each of said tags is determined by said respective line spacing data value SD; said set of tags consists of a number of tags determined by the respective tag number data value ND for said set of tags; and all of said tags are printed based on the input printing data.

4,988,222

DOUBLE PRINT HEAD

Tetsuya Yamamoto; Takashi Moriya, and Yoshimasa Tai, all of Tanashi, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,250
Claims priority, application Japan, Dec. 23, 1987, 62-195062
Int. Cl.[5] B41J *2/505*
U.S. Cl. 400—124 4 Claims



1. In a dot matrix double print head for a dot matrix printer including a front actuator and a rear actuator, each actuator having:

a print wire unit in which a plurality of print wires are slidably mounted, the print wires associated with the front actuator being shorter than the print wires associated with the rear actuator;

a plurality of electromagnets; and

a plurality of armatures operatively associated with the electromagnets so as to actuate corresponding wires;

and means for providing substantially equal moments of inertia for each of the armatures and their associated print wires of both of the actuators, said means including making the armatures of the rear actuator of a shorter length

than the armatures of the front actuator so that each long print wire is actuated by a short armature and each short print wire is actuated by a long armature.

4,988,223

MATRIX PRINTING HEAD WITH PIVOTABLE ARMATURES

Jürgen Hilkenmeier, Paderborn, and Hans W. Volke, Salzkotten, both of Fed. Rep. of Germany, assignors to Protechno Ces GmbH & Co Kg, Salzkotten, Fed. Rep. of Germany

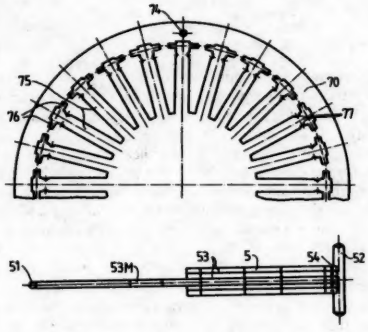
PCT No. PCT/EP88/00393, § 371 Date Nov. 7, 1988, § 102(e) Date Nov. 7, 1988, PCT Pub. No. WO88/08792, PCT Pub. Date Nov. 17, 1988

PCT Filed May 7, 1988, Ser. No. 272,680

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715304

Int. Cl.[5] B41J *2/27, 2/235*

U.S. Cl. 400—124 **14 Claims**



1. In a matrix printing head having a plurality of printing wires, means mounting the printing wires for sliding movement between a non-printing rest position and a printing position, electromagnetic means for driving each printing wire from the rest position to the printing position including an electromagnet comprising a yoke having a pole surface, a winding and a pivotable armature connected to each wire and having a pivot, an armature stop and means biasing the armature away from the pole surface and into the armature stop to define the rest position and forming a gap between the armature and the pole surface, the improvement wherein the electromagnetic means comprises a structure composed of light metal and having means forming segmental recesses therein for receiving the yokes and windings and secured therein with a casting compound, wherein the light metal structure has one face in a plane and wherein the pole surfaces are in said plane, spacer members disposed between the face of the light metal structure and the armature stop and composed of sheet metal, wherein a first one of said spacer members has first segmental cutouts extending radially inwardly and accomodating the armatures and second segmental cutouts accommodating the armature pivots and a second one of said spacer members having segmental cutouts accommodating the armatures, the first spacer member abutting the armature stop and the second spacer member being disposed between the first spacer member and the pole surface and the gap being defined by the difference between the thickness of the spacer members and the armature.

4,988,224

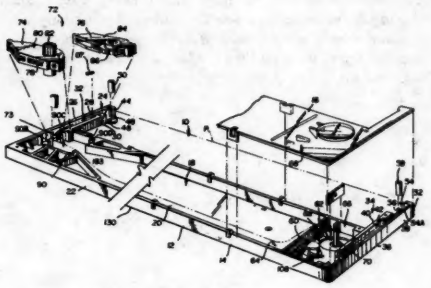
UNIVERSAL RIBBON CARTRIDGE FOR HIGH-SPEED PRINTERS

Edward D. Furrow, Waynesboro, and Leon C. Johenning, II, Lexington, both of Va., assignors to Genicom Corporation, Waynesboro, Va.

Filed Oct. 9, 1986, Ser. No. 917,358

Int. Cl.[5] B41J *32/02*

U.S. Cl. 400—194 **22 Claims**



1. A print ribbon guide comprising:

structure adapted to engage with a printhead of a printer, said structure including guide means for guiding a translating print ribbon along a path between and substantially parallel to (a) a printing surface of said printhead, and (b) a medium to be printed, said structure defining an opening between said printhead and said medium;

said structure comprising a smudge guard disposed across said opening, said smudge guard defining an orifice therethrough in registry with said printhead printing surface; and

a member engaged with said structure and movable relative to said structure between a first position whereat said member biases said ribbon in a stationary position against said smudge guard and a second position whereat said member permits said ribbon to freely translate along said path, said member moving to said first position when said structure is disengaged from said printhead, said member moving to said second position when said structure is engaged with said printhead.

4,988,225

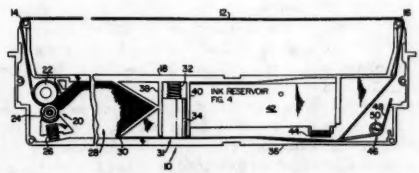
CONTINUOUS SELF-INKING RIBBON CARTRIDGE SYSTEM

George C. Huang, Bethany, Conn., and Daniel Zhu, Rego Park, N.Y., assignors to Jing Tech, Inc., Bethany, Conn.

Continuation-in-part of Ser. No. 185,844, Apr. 25, 1988, abandoned. This application Sep. 8, 1988, Ser. No. 243,243

Int. Cl.[5] B41J *32/02*

U.S. Cl. 400—196.1 **16 Claims**



1. A ribbon cartridge system for use with a printing device, comprising:

an endless ribbon;

a case receiving said ribbon, said case adapted to be received by the printing device so that the ribbon will be advanced

through the ribbon cartridge while the printing device is operational;

a plurality of roller means positioned within said case for guiding the ribbon during ribbon advancement;

an ink reservoir element including a container having liquid ink initially sealed in a first chamber, and including a means for selectively enabling said ink to flow to a second chamber and a wick configured with said second chamber to controllably present said ink at the exterior of said container; and

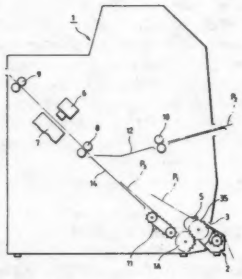
a ribbon control means configured within said case to allow said ribbon to contact directly with said wick only when said ribbon is being advanced and to hold the ribbon out of engagement with said wick when said ribbon is not being advanced by the printing device.

4,988,226

PRINTER HAVING MAIN AND AUXILIARY PIN TRACTOR UNITS

Noritsugu Ito, Chita, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 13, 1989, Ser. No. 420,882
Claims priority, application Japan, Oct. 13, 1988, 63-257883; Oct. 21, 1988, 63-266775
Int. Cl.[5] B41J *11/50*
U.S. Cl. 400—605 **26 Claims**



1. A printer comprising:

a housing;

a print section including a print head and a platen disposed in confronting relation with each other for performing a print operation on a sheet of paper fed between the print head and the platen;

a first pin tractor unit fixedly secured within the housing, the first pin tractor unit including a first pin tractor on which a first continuous print sheet is adapted to be loaded for supplying said first continuous print sheet to said print section; and

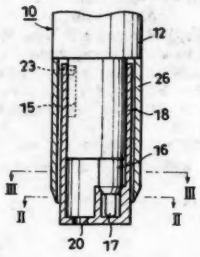
a second pin tractor unit detachably mounted on said housing in a position above said first pin tractor unit so that said first pin tractor unit is exposed to allow the first continuous print sheet to be loaded on said first pin tractor when said second pin tractor unit is detached from said housing, said second pin tractor unit including a second pin tractor on which a second continuous print sheet is adapted to be loaded for supplying said second continuous print sheet to said print section.

4,988,227

WRITING MEANS

Ryuzo Imazu, Osaka, Japan, assignor to Fuji Sangyo Co., Ltd., Osaka, Japan

Filed Dec. 14, 1988, Ser. No. 284,503
Claims priority, application Japan, Dec. 28, 1987, 62-335266
Int. Cl.[5] B43K *7/02*
U.S. Cl. 401—117 **5 Claims**



1. A writing device comprising:

a cylindrical body having a surface at an axial extremity of the body which is transverse with respect to the axis of the body;

a writing unit disposed at said surface of said body;

a cylindrical closing member rotatably and axially movably disposed at said extremity of said body with the axis of said member being parallel to the axis of said body;

said writing unit including an ink tank and a pen tip attached to said ink tank,

said closing member having a surface at an axial extremity thereof which is transverse with respect to the axis of the cylinder and is provided with a cap unit for hermetically covering said pen tip and with a through-hole through which said pen tip is movable,

relative locations of the pen tip, cap member and through-hole being so selected that rotation of and axial movement of said closing member with respect to said body selectively provides two states, one of said states being where said pen tip is hermetically covered with said cap unit and the other of said states being where said pen tip projects through said through-hole; and

an operating tube mounted for rotation relative to said body and said closing member for driving said closing member between said two states.

4,988,228

BRUSH WITH EXTENDIBLE AND RETRACTABLE BRISTLE ELEMENTS

Ching-Yuan Yeh, No. 39, Lane 300, Tun Hua S. Rd., Taipei, Taiwan

Filed Mar. 26, 1990, Ser. No. 499,168
Int. Cl.[5] A46B *11/06, 7/06;* A45D *24/16*
U.S. Cl. 401—289 **2 Claims**

1. A brush comprising:

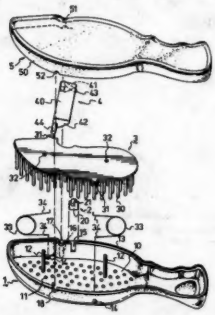
a housing unit having a top wall, a bottom wall having a plurality of bristle holes formed therethrough, a peripheral wall interconnecting peripheries of said top and bottom walls, and a retaining groove formed in an outer surface of said peripheral wall;

a bristle plate disposed within said housing unit and including a plurality of bristle elements projecting downward therefrom;

a guide unit for guiding said bristle elements to move through said bristle holes of said housing unit;

a resilient unit biasing said bristle plate to move upward in said housing unit, so as to retract said bristle elements into said housing unit;

a bristle-pushing member including a generally inverted U-shaped body riding on said bristle plate, a rotating shaft provided on said body and journalled in said housing unit, a rotary lever connected securely to an end of said body, and a push lever connected securely to the other end of



said body, rotation of said rotary lever moving said bristle elements between an extension position and a retraction position, said rotary lever engaging said retaining groove of said housing unit for preventing rotation of said rotary lever when said bristle elements are at said extension position, actuation of said push lever disengaging said rotary lever from said retaining groove of said housing unit for permitting rotation of said rotary lever; and

a bias element biasing said rotary lever to engage within said retaining groove of said housing unit when said bristle elements are at said extension position.

4,988,229

SINGLE HAND NOTEBOOK

Maynard Ramsey, III, Tampa, Fla., assignor to Critikon, Inc., Tampa, Fla.

Filed May 17, 1989, Ser. No. 353,268

Int. Cl.[5] B42F *13/40*

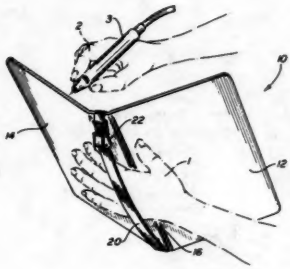
U.S. Cl. 402—4 **10 Claims**

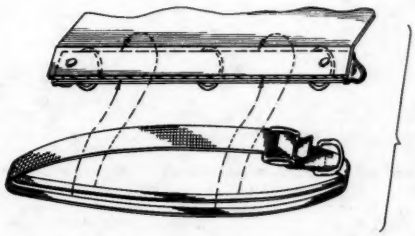
1. A notebook which may be manipulated in an open condition by one hand of a user comprising:

a front cover and a back cover joined by a binding panel;

means, connected to the inside of said binding panel, for retaining pages within the notebook;

a strap affixed to said binding panel and passing between said retaining means and said binding panel, said strap being continuously connectable around the outside of said binding panel,





whereby a hand of a user may be inserted between said strap and the outside of said binding panel to hold said notebook.

4,988,230

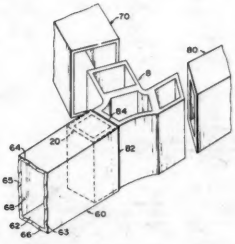
EXTRUDED NODE

Vinod K. Banthia, Monroeville; Russell S. Long, Elizabeth, and James D. Klingensmith, Apollo, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 7, 1989, Ser. No. 320,250

Int. Cl.[5] F16B *7/00, 1/00*

U.S. Cl. 403—170 **25 Claims**



1. In a vehicle frame wherein end portions of a plurality of lineals are interconnected by nodes in a structural, vehicular frame construction, the improvement comprising:

an extruded aluminum alloy node having

a substantially hollow body and

at least one hollow male member having spaced apart sidewalls extending from the body, said sidewalls integrally connected by an endwall, said sidewalls and endwall having a wall thickness less than about four millimeters, said male member projecting from the body at an oblique

angle for assembly and bonding with female ends of said lineals through an interconnecting fit and through an auxiliary assembly means selected from the group consisting of welding, adhesive bonding and combinations thereof, said hollow body and hollow male member having parallel openings through the node in a longitudinal direction.

4,988,231

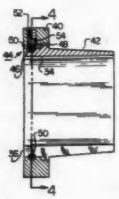
BUSHING

Delmer E. Pettit, East Bend, N.C., assignor to Industrial Fabricators Machine, Inc., Winston-Salem, N.C.

Filed Jul. 21, 1989, Ser. No. 383,744

Int. Cl.[5] D25G *3/20*; F16B *2/00*

U.S. Cl. 403—370 **15 Claims**



1. A bushing for securing a hub to a shaft, said bushing having a body member having two ends, a flange located on one of said ends to define with said body member a contiguous planar end surface and a central bore for receiving the shaft; and

(a) a ridge potion located between said body member and said flange for preventing movement therebetween in at least one axial direction, said ridge portion being confined to the region between said body member and said flange and recessed within said flange to permit said flange and ridge portion to be mounted substantially flush against the end surface of said hub; and

(b) retaining means located therebetween said body member and said flange and operable to permit tangential rotation between said body member and said flange while at the same time preventing axial movement therebetween.

4,988,232

JOINT MEMBERS

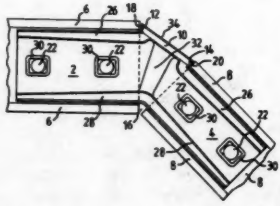
Benjamin Mason, Notts, England, assignor to Caledonian Mining Co., Ltd., United Kingdom

Filed May 23, 1989, Ser. No. 355,982

Claims priority, application United Kingdom, Jun. 20, 1988, 8814641

Int. Cl.[5] B25G *3/36*

U.S. Cl. 403—403 **8 Claims**



1. A fishplate for connecting two I-section beams, the mating ends of each beam being cut perpendicular to its axis, said fishplate comprising

two arms connected together at a central position at an angle relative one to the other, said arms defining an inner corner and an outer corner, and

an outwardly projecting block connected to said central portion, each end of said block defining a side oriented perpendicular to the axis of its associated arm,

said arms and block being sized so that when said beams are joined with said fishplate the adjacent ends of one pair of flanges of said beams nearly abut at said inner corner and the adjacent ends of the other pair of flanges of said beams abut the respective adjacent sides of said block.

4,988,233

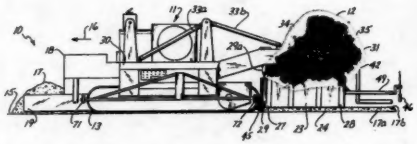
PAVING MACHINE

Richard E. Kasler, Long Beach, and Danny J. O'Bryan, Yucaipa, both of Calif., assignors to Kasler Corporation, San Bernadino, Calif.

Filed Dec. 30, 1988, Ser. No. 292,227

Int. Cl.[5] E01C *19/00*

U.S. Cl. 404—108 **33 Claims**



1. A paving machine, comprising:

a tractor for moving a pan assembly in a desired direction of travel on a roadway to be paved, the tractor having left and right tracks;

a pan assembly for forming a quantity of concrete mud into a slab having a desired width and elevation as the tractor moves the pan assembly on the roadway, the pan assembly having a pan that extends laterally substantially the full desired width and rearwardly from a leading edge portion of the pan to a trailing edge portion of the pan;

means for mounting the pan assembly on the tractor so that the leading edge portion of the pan is disposed rearwardly of at least one of the left and right tracks;

the tractor including a frame structure and the means for mounting the pan assembly including a cantilever beam attached rigidly to the frame structure for use in supporting the pan assembly so that the weight of the tractor can be used to bear downwardly on the pan in order to control the thickness of the slab.

4,988,234

GULLEY CLOSURE

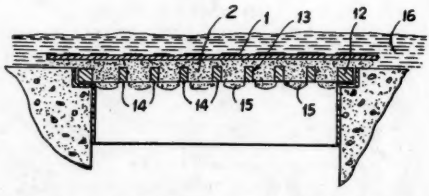
Hanno Henkel, Krefeld; Karl-Heinz Rudolph, Cologne; Friedhelm Sahlmen, Moers, and Rolf Brockmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 27, 1989, Ser. No. 371,781

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824485

Int. Cl.[5] E02D *29/14*

U.S. Cl. 405—36 **7 Claims**



1. A closure for inlet grating of a fluid drainage system comprising: a flexible substrate for covering an exposed surface of an inlet grating having drainage holes therein and a

viscous, free flowing composition on one side of the substrate facing the exposed surface of the inlet grating for directly contacting the inlet grating and at least partly filling the drainage holes to liquid tightly seal same.

4,988,235

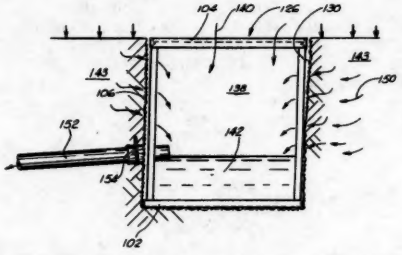
SYSTEM FOR DRAINING LAND AREAS THROUGH SIPHONING FROM A PERMEABLE CATCH BASIN

Dennis Hurley, P.O. Box 702, Marrero, La. 70073

Continuation-in-part of Ser. No. 187,022, Apr. 27, 1988, Pat. No. 4,919,568. This application Feb. 1, 1999, Ser. No. 473,614

Int. Cl.[5] E02B *11/00*

U.S. Cl. 405—50 5 Claims



1. An improved catch basin positionable within the soil, the catch basin comprising:

(a) a catch basin frame, comprising a floor portion, a top portion, four corner upright post members, the floor portion, top portion, and four post members when assembled, defining the framework of the catch basin;

(b) a permeable bag, positioned into an opening in the soil, for placing the erected frame into the opening, the bag comprising a geo-textile fabric, so that air and water may be absorbed from the soil profile surrounding the bag and may flow through the geo-textile fabric in the wall portions into interior of the catch basin;

(c) an upper grate portion, positioned on top of the top portion, for receiving ground water flowing through the top portion into the interior of the catch basin; and

(d) means for draining the water from the water collected in the catch basin to a distant collection point.

4,988,236

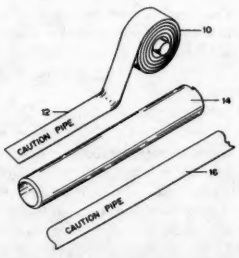
POLYMERIC TAPE WITH BIOCIDE

Boyd J. Ramsey, Houston, and William D. Cameron, Galveston, both of Tex., assignors to Reef Industries, Inc., Houston, Tex.

Continuation of Ser. No. 221,275, Jul. 19, 1988, abandoned, which is a continuation-in-part of Ser. No. 77,592, Jul. 24, 1987, abandoned. This application May 15, 1990, Ser. No. 523,849

Int. Cl.[5] F16L *57/00*

U.S. Cl. 405—157 14 Claims



1. A polymeric tape for use underground comprising at least one layer of thermoplastic;

said thermoplastic including a biocide in a sufficient amount for biocidal activity;

said biocide mixed with the thermoplastic prior to extrusion of the polymer tape; and

said biocide leachable from said thermoplastic layer to effectively retard biological growth at the surface of the tape and the surrounding soil.

4,988,237

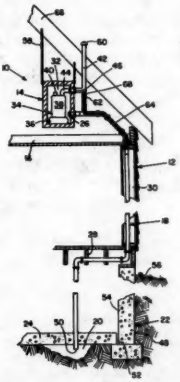
SOIL GAS REDUCTION SYSTEM

Geoffrey K. Crawshaw, 42 Lehigh Rd., Wellesley, Mass. 02181

Filed Sep. 29, 1989, Ser. No. 414,907

Int. Cl.[5] E02D *27/00*

U.S. Cl. 405—229 17 Claims



1. A system for extracting gas emanating from soil at a subterranean cavity adjacent a floor slab and venting the gas to the atmosphere comprising:

a vacuum pump for pumping the gas to the atmosphere, having a pump motor, a pump inlet port and a pump outlet port;

a vacuum tight housing defining a housing chamber for housing the vacuum pump and having a housing outlet port and a housing inlet port and wherein the pump outlet port is coupled to the housing outlet port and the pump inlet port is coupled to the housing chamber;

a fluid vacuum conduit extending within said subterranean cavity for providing fluid communication between the cavity and the housing inlet port of the housing for coupling the gas to the housing to circulate gas over the motor;

a vent coupled to the housing outlet port for providing fluid communication between the pump outlet and the atmosphere.

4,988,238

METHOD FOR IMPROVING THE STRENGTH AND IMPERMEABILITY OF SOILS AND ENGINEERING STRUCTURES

Tamas Szekely; Gabor Nagy; Andras Danko, all of Budapest; Janos Szepvolgyi, Tatabanya; Andras Gal, and Oszkar Libor, both of Budapest, all of Hungary, assignors to Altalanos Iparfejlesztesi Rt., Budapest, Hungary

Filed Oct. 31, 1989, Ser. No. 429,945

Int. Cl.[5] E02D *3/12*

U.S. Cl. 405—263 3 Claims

1. A method for improving the strength and impermeability of soils or engineering structures, which comprises the steps of:

(a) applying to the site of the soil or of the engineering structure, an alkaline water glass solution comprising

water glass in an amount of 15 to 40% by weight, calculated as dry substance;

(b) allowing a time period to pass sufficient to permit the alkali present in the water glass solution to move by diffusion;

(c) applying to the same site as in step (a), a silicic acid sol comprising SiO_2 in an amount of 5 to 50% by weight calculated as dry substance, and an organic dispersion medium in which 10 to 100% by volume of the dispersion medium consists of a water-miscible organic solvent capable of reacting with the alkali content of the water glass solution applied during step (a), thereby gellifying the water glass so that the reaction product of the water-miscible organic solvent and the alkali content of the water glass is trapped within the gelled water glass; and

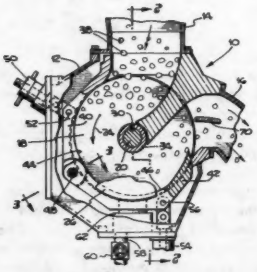
(d) allowing a time period to pass sufficient to permit the respective organic dispersion medium present in the silicic acid sol to move by diffusion, so that gellification of the water glass takes place evenly when mixing of the water glass solution applied during step (a) and the silicic acid sol applied during step (c) to the soils or to the engineering structures takes place to effect a plasticizing effect on the resulting water glass gel.

4,988,239

MULTIPLE-CHOKE APPARATUS FOR TRANSPORTING AND METERING PARTICULATE MATERIAL

Donald Firth, Devon, England, assignor to Stamet, Inc., Santa Monica, Calif.

Filed Mar. 5, 1990, Ser. No. 488,314
Int. Cl.[5] B65G *31/04*
U.S. Cl. 406—99 **15 Claims**



1. An apparatus for transporting particulate material comprising:

a housing having an inlet, an outlet and a duct between said inlet and outlet, said duct being formed between two opposed friction drive walls movable relative to said pump housing from said inlet towards said outlet and one or more stationary walls fixed relative to said pump housing with respect to movement between said inlet and said outlet, said friction drive walls having a greater surface area for contacting said solid material than said stationary walls;

first choke means for compacting to bridge said particulate material after introduction into said inlet, said first choke means including a convergence of said friction drive walls and said stationary walls to provide a first of said duct having a cross-sectional area which is less than the cross-sectional area of said inlet;

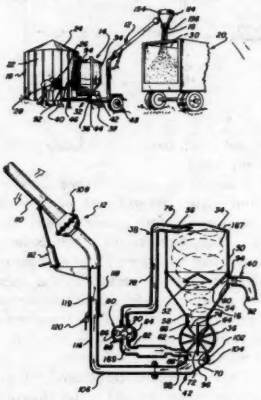
second choke means for disturbing the relationship of said particulate material after said particulate material passes through said first choke means and then recompacting said particulate material, said second choke means including a divergence of said friction drive walls and said stationary walls to provide a second portion of said duct having a cross-sectional area which is greater than the cross-sectional area of said first portion of said duct, but less than the cross-sectional area of said inlet, said second choke means also including a convergence of said friction drive walls and said stationary walls located between said second portion of said duct and said outlet to provide a third portion of said having a cross-sectional area which is less than the cross-sectional area of said second portion of said duct.

4,988,240

MATERIAL TRANSFER ASSEMBLY

Andy L. Thompson, R.R. 1, Courtland, Kans. 66939

Filed Dec. 5, 1988, Ser. No. 279,840
Int. Cl.[5] B65G *53/40*
U.S. Cl. 406—166 **10 Claims**



1. A material transfer assembly connected to a pneumatic grain handling system operable to transfer a granular material from a storage container to a transport means, comprising:

(a) an inlet tube assembly connected to a discharge mixer tube member from the pneumatic grain handling system to receive a mixture of the granular material and pneumatic fluid pressure therefrom;

(b) a discharge joint assembly connected to said inlet tube assembly and adjustably movable about a vertical axis;

(c) a discharge tube assembly connected to an output side of said discharge joint assembly projected laterally of said inlet tube assembly;

(d) said inlet tube assembly includes a first tube member connected at one end to said discharge mixer tube member and a second tube member telescopingly mounted upon said first tube member and having another end thereof connected to said discharge joint assembly;

(e) said first tube member includes a laterally extended support flange having said second tube member mounted thereon; and

(f) said inlet tube assembly includes a lock arm assembly connected to said second tube member and selectively engagable with said support flange on said first tube member to anchor said second tube member thereto in a selected adjusted rotational position relative thereto;

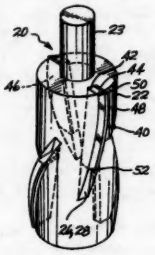
whereby a discharge of the mixture of the granular material and pneumatic fluid pressure from said discharge tube assembly can be adjusted as required to direct same into the transport means.

4,988,241

CUTTER WITH ANGLED DIAMOND INSERTS

Kevin J. Colligan, Snoqualmie, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 15, 1989, Ser. No. 407,524
Int. Cl.[5] B23C 3/00, 3/12
U.S. Cl. 407—51 17 Claims



3. A cutter comprising:

a body having a nominal outer surface defining a cylinder with a longitudinal axis and a cutting radius, and a slot opening onto said surface and extending along a plane that intersects said axis at an acute axial rake angle; and

an essentially flat cutter blade insert secured in said slot and having an elliptical cutting edge extending along said surface;

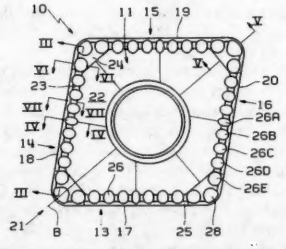
in which said cutting edge has a first leading end, and a second opposite end; a minimum relief angle is required at said first end to prevent contact between said cutter and a workpiece behind said cutting edge; and said cutter has a first relief angle at said first end at least as great as said minimum relief angle, and a second relief angle at said second end at least as great as said minimum relief angle plus the angle between radial lines of said cylinder through said first and second ends, respectively.

4,988,242

CUTTING INSERT FOR CHIP FORMING MACHINING

Lars T. Pettersson, Glen Rock, N.J., and Jörgen V. Wiman, Sandviken, Sweden, assignors to Sandvik AB, Sandviken, Sweden

Filed Sep. 19, 1989, Ser. No. 409,944
Claims priority, application Sweden, Sep. 22, 1988, 8803354
Int. Cl.[5] B23P 15/28
U.S. Cl. 407—114 10 Claims



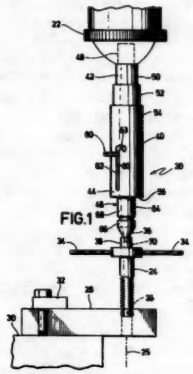
1. A cutting insert for chip forming machining comprising a polygonally shaped body having a rake face and a clearance surface, a cutting edge disposed at an intersection of said rake face and said clearance surface, said rake face including a chip forming portion extending along said cutting edge, said chip forming portion including a plurality of ridges each extending transversely relative to said cutting edge, there being at least three said ridges spaced apart along said chip forming portion, said at least three ridges lying in a common plane, distances separating adjacent ones of said ridges being non-uniform whereby a distance disposed at an end of said cutting edge being greater than a distance disposed at a middle of said cutting edge.

4,988,243

SPRING-LOADED CENTER

Jimmie L. Proffitt, 11905 W. Kingsgate Rd., Concord, Tenn. 37922

Filed Feb. 21, 1989, Ser. No. 313,584
Int. Cl.[5] B23G 3/00
U.S. Cl. 408—241 R 7 Claims



1. A center for maintaining a cutting tool, such as a tapping tool or reamer, in axial alignment with a hole to be worked upon, said center comprising:

an elongated body having two opposite ends, one of said ends adapted to be mounted within the holding device of a machine tool positioned in registry with the hole to be worked upon, the body defining an elongated cavity opening out of the other end of said body and including a slot extending along a side of said body and in communication with said cavity;

an elongated centering pin having a tipped shank which is positioned within said elongated cavity so that the tip of said shank is directed generally out of the cavity for cooperatively engaging the cutting tool with which the center is to be used, said shank being positioned within said cavity for sliding movement longitudinally of said body between an extended position at which a substantial portion of said pin extends out of said cavity and a retracted position, said centering pin including an accessible handle joined to said shank and extending through said slot, said handle cooperating with said slot so that as said centering pin is guided along said cavity, the handle is guided along said slot;

biasing means interposed between said centering pin and said elongated body for biasing the centering pin shank from the retracted position toward the extended position; and

said body slot having an elongated section extending linearly along one side of said body and parallel to the longitudinal axis thereof and an L-shaped notch joined to said elongated slot section at an end thereof opposite said other end of said body, said L-shaped notch having two leg portions forming a right angle with one another, one leg of said L-shaped notch being joined to said elongated slot section so as to form substantially a right angle therewith and the other of the notch legs being oriented substantially parallel to the elongated slot section and directed from the one notch leg generally toward said other end of said body;

said handle being slidably movable relative to said body through the elongated slot section for moving the centering pin axially through the body cavity between the ex-

tended and retracted positions, being slidably movable relative to said body through said one leg of said notch for rotating the centering pin within the body cavity between a first position at which the handle is positioned at the end of said slot section opposite said other end of said body and a second position at which the handle is offset to one side of said elongated slot section, and being slidably movable relative to said body into and out of said other leg of said notch for axially shifting the centering pin through the body cavity between said second position and a locked position at which the handle cooperates with said other leg to prevent the centering pin from rotating within the body cavity and returning to the extended position, the L-shaped notch being disposed along the length of the body so that upon manipulation of the handle from the elongated slot section and into said other of the notch legs through said one notch leg, the centering pin is releasably locked in a retracted position against the biasing force of the biasing means and prevented from returning to the elongated slot section; and

said centering pin shank including an end section providing the tip of said shank and another section to which said handle is connected so that the rotation of said another section relative to said body is prevented when said handle is positioned in the elongated section of said slot or the other leg of the slot notch, and said end section is journaled to said another section so that when the tip cooperatively engages a cutting tool and the cutting tool is rotated, the end section is permitted to rotate with the cutting tool.

4,988,244

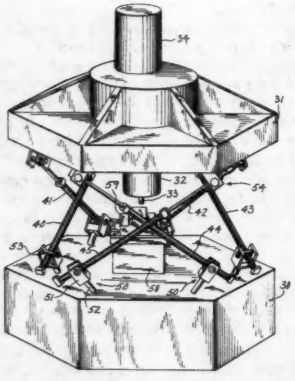
SIX-AXIS MACHINE TOOL

Paul C. Sheldon, Mequon, and Edward E. Kirkham, Brookfield, both of Wis., assignors to Kearney & Trecker, Milwaukee, Wis.

Division of Ser. No. 7,401,909, Sep. 1, 1989, abandoned. This application Aug. 23, 1990, Ser. No. 572,167

Int. Cl.[5] B23C *1/06*; B25J *11/00*

U.S. Cl. 409—132 **5 Claims**



1. In a machine tool having a tool holder and a workpiece support, the combination comprising:

a tool holder platform locating the tool holder;

a workpiece support platform locating the workpiece support;

six powered and controlled extensible legs connecting the platforms together in spaced relation, each of the legs being joined to the workpiece support platform at one point along the length of the leg and being joined to the tool holder platform at a second spaced point along the length of the leg;

an actuator for each leg for individually extending and contracting the length of the leg; and

a control for the leg actuators to coordinate the operation of the actuators to vary the position of the tool holder relative to the workpiece support, said control including sensing means for determining the length of each of the six legs,

the sensing means including a plurality of extensible instrument arms connected between said platforms in a known relation to the legs so that a change in length of the legs alters the relationship between the platforms which translates into changes in length of the instrument arms.

4,988,245

CHAMFERRING MACHINE

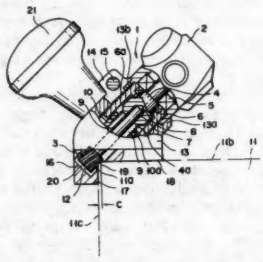
Kenji Fukuda, Tokyo, Japan, assignor to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed Sep. 12, 1988, Ser. No. 243,276

Claims priority, application Japan, Oct. 20, 1987, 62-160070

Int. Cl.[5] B23C *1/20*

U.S. Cl. 409—178 **6 Claims**



1. A chamferring machine comprising:

a machine body including a driving source, a spindle housing fixed to said driving source and having an outer periphery, and a spindle housed in said spindle housing, driven by said driving source and having a free end and an outer periphery;

a rotary cutter having a shank fixed to said free end of said spindle, coaxially therewith, and an outer cylindrical periphery having the same diameter throughout the whole length thereof and formed with cutting edges;

a guide base surrounding said spindle and having one end remote from said free end of said spindle and the other end close thereto, said guide base having at said one end thereof a boss;

a guide fixed to the other end of said guide base, surrounding said rotary cutter and having two guide surfaces forming a predetermined intersecting angle, each of said guide surfaces extending at a predetermined angle with respect to said rotary cutter, said guide having a crosswise extending hole formed therein, at the intersection of said guide surfaces, such that part of said cutting edges of said rotary cutter extends from said crosswise extending hole; and

displacing means for axially displacing said rotary cutter relative to said crosswise extending hole such that new portion of said cutting edges of said rotary cutter extend from said crosswise extending hole at said intersection of said guide surfaces when said part of said cutting edges of said rotary cutter has become dull, said displacing means comprising male threads formed on said outer periphery of said spindle housing, female threads formed in said boss of said guide base and engaging said male threads and adjusting means for adjusting the degree of engagement between said male threads and said female threads.

4,988,246

APPARATUS FOR INDICATING INCOMPLETE AND COMPLETE FASTENING OF SCREW COMPONENTS

Minoru Yoshida, Yamato; Teruo Arai, Tokyo; Toshiro Ishikawa, Yamato; Masaji Shimada, Tokyo; Shigeru Susaki, Yokohama; Yukihiko Yamada, Yamato; Hisao Ohta, Tokyo; Katsuyoshi Nagami, Ebina; Kazutami Hayajiri, Yamato; Takaharu Yoshioka, Sagamihara; Shigo Hirai, Yamato; Tosio Ichida, Ashigarakami, and Nobuyuki Ishii, Tokyo, all of Japan, assignors to Kyodo Electric Co., Ltd., Tokyo, Japan

Filed Feb. 23, 1990, Ser. No. 483,822

Claims priority, application Japan, Mar. 17, 1989, 1-31032[U]; May 19, 1989, 1-58239[U]

Int. Cl.[5] F16B *31/02*

U.S. Cl. 411—10 12 Claims

1. Apparatus for indicating incomplete fastening of screw components comprising:

a washer member comprising a generally flat sheet of material which has a first opening of a size sufficient for receiving the shank of screw components and preventing a nut and a head of said screw components from passing through the first opening; and

a ring member comprising a generally flat synthetic resin sheet of material which has a second opening of a size sufficient for receiving the shank of screw components and preventing the nut and head of said screw components from passing through the second opening;

said washer member comprising:

a pair of washer portions each having a generally flat, round external shape whose outside diameter is at least equal to that of the head portion of the screw components and has a first opening formed almost on the center thereof; and

a joint portion for jointing the pair of washer portions in confronting relationship with each other so that the first openings on each of the pair of washer portions may equally receive the shank of the screw components, said joint portion having a section substantially perpendicular to the axial extension of the shank of the screw components transforming into generally a U shape when the washer member receives the shank;

said ring member including a generally circular deformable material inserted between the pair of washer portions, the generally circular material having an outside diameter larger than that of either of the pair of washer portions;

said deformable material being lengthened radially when the first and second openings receive the shank of the screw components and the deformable material is compressed by the pair of washer portions due to fastening of said screw components, said deformable material being broken due to overlapping of the pair of washer portions when compression force substantially reaches a predetermined value.

4,988,247

BLIND RIVET AND METHOD OF MAKING SAME

Frederick A. Summerlin, The Carriage House, Alston Hall,, Holbeton, Plymouth, Devon PL8 1HL, United Kingdom

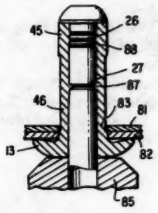
Filed May 4, 1990, Ser. No. 519,123

Claims priority, application United Kingdom, May 16, 1989, 8911218

Int. Cl.[5] F16B *13/04*

U.S. Cl. 411—38 6 Claims

1. A self-plugging blind rivet for securing together apertured members, the rivet comprising a tubular shell having a shank, a tail end face at one end of the shank and a preformed radially enlarged head at the other end of the shank, and a stem which extends through the shell and has a stem head contacting the tail end face of the shank, the shell shank having an increased



outside diameter in its tail end region, the material in said tail end region being harder than the material of the shank in that shank region adjacent said preformed radially enlarged head.

4,988,248

RELEASABLE COUPLING OR ATTACHMENT DEVICE

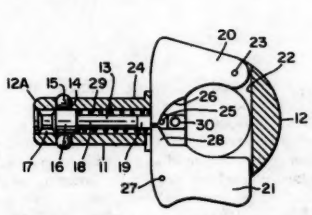
Peter R. Flux, Wilshire, England, assignor to Latchways Limited, Wiltshire, England

Filed Jan. 8, 1990, Ser. No. 462,101

Claims priority, application United Kingdom, Jan. 16, 1989, 8900904

Int. Cl.[5] F16B *21/00*; F16D *1/00*

U.S. Cl. 411—348 12 Claims



1. A coupling or attachment device comprising a head portion and a hollow shank projecting therefrom for plugging into a receptor socket, the shank being provided with locking means movable transversely thereof between a projecting locked condition and a retracted free condition, and control means movably mounted within the shank between a first position maintaining the locking means in said locked condition and a second position allowing movement of said locking means to said free condition, said head portion having a release mechanism comprising actuator means for moving said control means from said first position to said second position and releasable means cooperating with the actuator means or the control means and adapted to prevent operation of said control means by an inadvertent or accidental engagement with the actuator means;

wherein said actuator means comprise a pivotally mounted release lever having a portion interlinked with said control means, said lever having a portion projecting from said head portion allowing a manual manipulation of the release lever to move said control means from said first position to said second position thereof; and

wherein said releasable means comprise a pivotally mounted second lever having an abutment portion engaging a portion of said release lever to prevent movement thereof to move said control means from said first position to said second position thereof, said second lever having a portion projecting from said head portion allowing a manual manipulation of the second lever to remove said abutment portion from its position obstructing operation of said release lever.

4,988,249

METHOD FOR FASTENING AN ATTACHMENT OR SUSPENSION DEVICE AND A DEVICE FOR CARRYING OUT THE METHOD

Björn Kardefeldt, Nyköping, and Jan P. R. Tjäderhane, Oxelösund, both of Sweden, assignors to Thorsman & Co. Aktiebolag, Koping, Sweden

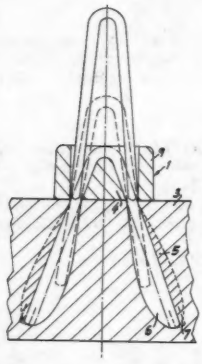
PCT No. PCT/SE87/00388, § 371 Date Apr. 25, 1988, § 102(e) Date Apr. 25, 1988, PCT Pub. No. WO88/02072, PCT Pub. Date Mar. 24, 1988

PCT Filed Aug. 31, 1987, Ser. No. 187,450

Claims priority, application Sweden, Sep. 12, 1986, 8603847

Int. Cl.[5] F16B *21/14*

U.S. Cl. 411—513 13 Claims



1. A fastening method comprising placing an attachment or suspension device on a porous support, the device having a fastener projecting from the device and provided with diverging legs straddling a tapered part, the legs having piercing ends abutting against the surface of the porous support in a space around the tapered part and driving the fastener inwardly into the porous surface while concurrently increasing progressively the angle of divergence of the legs as the legs advance on said tapered part so that as said legs progressively penetrate into the porous support the legs are caused to turn outwardly and widen the hole formed by the penetration of legs into the porous support and laterally crush the material of the porous support.

4,988,250

BUCKET ELEVATOR TYPE CONTINUOUS SHIP UNLOADER

Masao Yamanaka, Niihama, Japan, assignor to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 362,780

Int. Cl.[5] B65G *17/36*

U.S. Cl. 414—141.1 19 Claims

1. A bucket elevator type ship unloader comprising:

a horizontal shovelling unit frame;

a lower front sprocket and a lower rear sprocket rotatably supported on front and rear end portions of said horizontal shovelling unit frame, respectively;

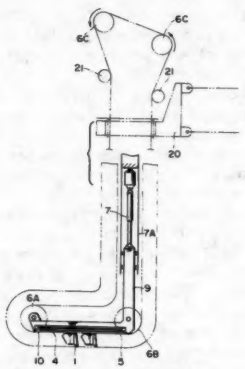
at least one upper sprocket rotatably supported above said lower rear sprocket;

endless bucket chains wound around said front and rear sprockets and said upper sprocket such that said chains encircle an L-shaped area as seen when looking in a sidewise direction;

a series of buckets mounted on said bucket chains at predetermined intervals;

means for moving said shovelling unit frame up and down relative to said upper sprocket;

at least one roller mounted on each of said buckets in a vicinity of a portion thereof through which said bucket is mounted on said bucket chains; and



at least one horizontal rail provided on said shovelling unit frame along a path of said bucket chains which runs between said front and rear sprockets on a straight line such that said at least one horizontal rail engages with each roller of each of said buckets, each roller travelling in a state where each roller is in engagement with said at least one horizontal rail when said bucket chains are stretched tautly between said front and rear sprockets by downward movement of said shovelling unit frame, wherein each roller disengages from said at least one horizontal rail by upward movement of said shovelling unit frame and rotation of said chains so as to put said chains into a form of a catenary.

4,988,251

MULTIPLE LOAD STORAGE RACK STRUCTURE

Thomas R. Kinney, Crete, Ill., assignor to Interlake, Inc., Oak Brook, Ill.

Continuation of Ser. No. 112,039, Oct. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 860,153, May 6, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 334,185

Int. Cl.[5] A47F *5/00*

U.S. Cl. 414—276 11 Claims

1. A storage rack structure comprising:

rack supports defining a storage bay of at least three load depths, at least one load height and width, and a load entry and removal area; and

at least two rail assemblies per load width on the rack supports in the storage bay;

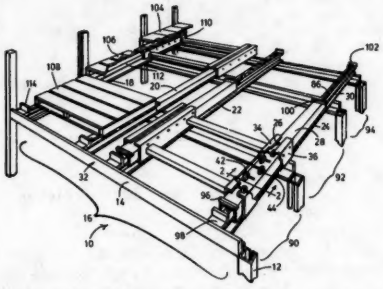
each rail assembly including a first load supporting rail of at least a single load depth, a second load supporting rail of at least a double load depth, and a third load supporting rail of at least three load depths, the first rail movably mounted on the second rail and the second rail movably mounted on the third rail;

each rail assembly being tilted downward toward the load entry and removal area;

a plurality of wheels in at least one linear series on the third rail, the wheels rollably supporting the second rail, the first rail and any loads thereon, on the third rail;

opposed guiding flanges on the third rail extending along the linear series of wheels on the third rail, the second rail having a pair of guided flanges mating with the guiding flanges and guiding the movement of the second rail along the third rail;

a plurality of wheels in two linear series on the first rail, the wheels rotatably supporting the first rail and any loads thereon on the second rail;



opposed guiding flanges on the second rail extending along the second rail, the first rail having a pair of guided flanges mating with the guiding flanges on the second rail and guiding the movement of the first rail along the second rail;

the first rail and second rail being balanced on the wheels rollably supporting the second rail;

the first and second rails being movable by gravity toward the load entry and removal area with the removal of the loads from the second and third rails, respectively; and

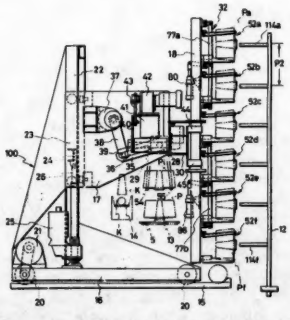
the first and second rails being pushable from the load entry and removal area after being loaded to facilitate loading of the third rail.

4,988,252

APPARATUS FOR SUPPLYING PACKAGES TO A WARPER CREEL

Yoshio Yamamoto, Kyoto, and Isao Nagasawa, Kusatsu, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jul. 14, 1988, Ser. No. 219,051
Claims priority, application Japan, Jul. 21, 1987, 62-181936
Int. Cl.[5] B65H *67/00*
U.S. Cl. 414—331 **18 Claims**



1. An apparatus for supplying a plurality of packages to and receiving a plurality of take-up tubes from pegs of a creel bogie, the apparatus comprising:

a movable bogie;

means for moving the movable bogie;

a lift supported by the bogie;

lift moving means for moving the lift with respect to the bogie;

a package transfer arm supported by the lift, said package transfer arm having a first side and a second side, the second side being arranged substantially 90° with respect to the first side;

a package holding mechanism provided on the first side of the package transfer arm, the package holding mechanism having package supplying means for supporting a plurality of packages and for simultaneously supplying the plurality of packages to a corresponding plurality of pegs of the creel bogie at a first time;

an empty take-up tube holding mechanism provided on the second side of the package transfer arm, the empty take-up tube mechanism having empty take-up tube receiving means for simultaneously receiving a plurality of empty take-up tubes from a corresponding plurality of pegs of the creel bogie at a second time, the second time being a different time than the first time; and

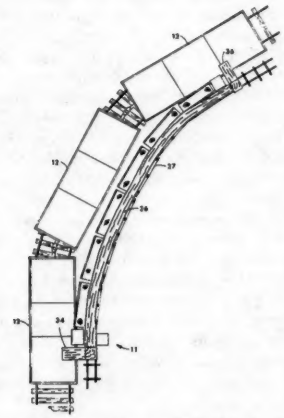
means for rotating the package transfer arm at least substantially 90°.

4,988,253

RECIPROCATING CONVEYOR LOADER

Robert M. McFall, P.O. Box 1282, Clintwood, Va. 24228

Continuation-in-part of Ser. No. 129,593, Dec. 7, 1987, abandoned. This application Sep. 28, 1989, Ser. No. 413,996
Int. Cl.[5] B65G *67/08*
U.S. Cl. 414—397 **1 Claim**



1. In combination with a laterally-curved, stationary line of railroad cars an apparatus for loading the cars with coal or other crushed, ground or particulate material gravitationally delivered to the apparatus from a loading center, said apparatus comprising:

a support frame positioned adjacent the railroad cars to be loaded and providing an elongated guideway extending generally along the line of railroad cars and generally corresponding in lateral curvature to the curved shape of the railroad car line as a path is traced from one end of the car line to the other end of the car line;

carriage means including a line of segmented carriages having two opposite ends and mounted upon the guideway of said support frame for movement longitudinally there-

along in either of two longitudinal directions, said segmented carriages being pivotally connected to one another to accommodate the longitudinal movement of the line of segmented carriages along a laterally-curved section of the guideway, said carriage means including wheels positioned in rolling contact with the guideway so that the line of segmented carriages is rollably mounted upon the guideway;

means associated with the carriage means for moving the line of segmented carriages in either of two longitudinal directions along the guideway;

an endless conveyor belt carried by the line of segmented carriages so as to provide an upper belt run which extends from one end of the line of segmented carriages to the other end of the line of segmented carriages, said belt being supported by the carriage means above the top of the railroad cars of the railroad car line, the upper run of the belt and the line of carriages having a length which is less than the length of the guideway so that while a portion of the upper run is positioned in a condition for gravitationally receiving coal or particulate material from the loading center, an end of the upper belt run can be positioned in a condition for delivering coal or other particulate material conveyed off of an end of the upper run into any of a number of cars in the railroad car line, the belt being constructed of an elastomeric material accommodating a lateral flexing of the belt through lateral curvatures in the line of segmented carriages and being trough-like in form so that its upper run provides an expansive trough-like supporting surface for receiving coal or other particulate material gravitationally delivered to said apparatus from the loading center;

means for moving the conveyor belt relative to the line of railroad cars so that the upper run of the belt bodily moves between the ends of the line of segmented carriages for conveying coal or other particulate material positioned therein to an end of the upper belt run and so that the conveyor belt can be moved in either of two directions relative to and along the line of segmented carriages, the conveyor belt cooperating with the carriage means so that the movement of the conveyor belt relative to the carriage means is independent of the movement of the line of segmented carriages along the guideway of the support frame; and

the support frame supporting the carriage means and conveyor belt in such a relation to the loading center and the line of railroad cars that while the upper run of the belt is positioned by the carriage moving means in a condition for receiving coal or other particulate material from the loading center, an end of the upper run can be positioned by the carriage means in a condition for directing coal or other particulate material which is conveyed off an end of the upper run into a preselected one of the railroad cars in the line,

wherein the stationary line of railroad cars is a first line of railroad cars and there exists a second line of railroad cars arranged parallel to and beside the first car line,

wherein the apparatus further comprises secondary transport means supported by the carriage means at each end of the line of segmented carriages for receiving coal or other particulate material which is conveyed off of an end of the upper run of the belt and directing the coal or particulate material into the top of at least one railroad car in the parallel arrangement of railroad car lines,

wherein said secondary transport means includes chute means for directing coal or particulate material delivered off of an end of the upper run simultaneously into the parallel lines of railroad cars.

4,988,254

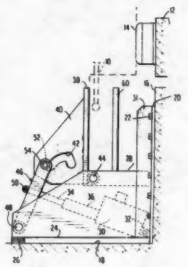
VEHICLE RESTRAINT

James C. Alexander, London, Canada, assignor to Serco Corporation, Ontario, Canada

Filed Aug. 16, 1988, Ser. No. 232,833

Int. Cl.[5] B65G *69/00*

U.S. Cl. 414—401 **21 Claims**



1. A device for restraining a vehicle having an ICC-bar at a loading dock comprising:

a frame fixedly mountable at said loading dock,

a restraining member pivotally mounted to said frame and movable relative to said frame from a lowered vehicle release position to an upward vehicle restraining position in which said ICC-bar is positioned between said loading dock and said restraining member;

a first support bracket fixedly secured to said restraining member and having a cam profile surface;

actuating means mounted to said frame having a linearly movable member;

first follower means pivotally mounted to said frame and coupled to said actuating means and having a member following said cam profile to translate linear motion of said linearly movable member into rotational motion of said restraining member, whereby said restraining member is rotated from said vehicle release position to said vehicle restraining position by linear movement of said actuating means,

second support bracket secured to said restraining member and having a cam profile therein, and second pivotally mounted follower means coupled to said actuating means and having a member disposed in the cam profile of said second support bracket to translate the linear motion of said linearly movable member into rotational motion whereby said restraining member is rotated from said release position to said restraining position by linear movement of said actuating means transmitted by both of said follower means.

4,988,255

UNPACKAGING MACHINE

Dalyn C. Hoffman, Augusta, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Feb. 22, 1989, Ser. No. 314,041

Int. Cl.[5] B65G *65/23*

U.S. Cl. 414—412 **19 Claims**

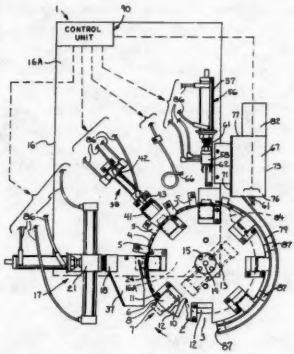
1. An unpackaging machine for removing the contents from a sealed container comprising:

means for receiving and transporting said sealed container;

means for removing a cap from said sealed container;

rotatable cutting means for rupturing a seal on said sealed container;

means for removing a cotton wad and said ruptured seal from said container;



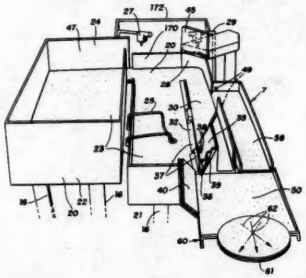
means for emptying said contents from said container; and means for discharging the emptied container.

4,988,256

PARTS ASSEMBLY KITTING APPARATUS AND METHOD

Paul R. Smith, Ortonville; Orval F. Wolfgram, Saginaw, both of Mich., and Rudolph G. Kobelia, Homer, N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 22, 1987, Ser. No. 112,502
Int. Cl.[5] B65G *47/00*
U.S. Cl. 414—416 **6 Claims**



1. An arrangement for compiling parts into individual kits made up of a first number of unique parts, each said geometrically shaped and sized unique part being stored in bulk in a separate first bin, said arrangement in combination comprising:

manipulating means for taking an individual unique part and placing said unique part in said kit;

at least one nest for each said geometrically shaped and sized unique part for holding said part for pickup by said manipulating means;

a second number of selectively directional diverting means for selectively delivering said parts to said respective nest, said second number being less than first number; and

a third number of feeders said feeders including a vibrator means; and

a fiber oriented platform mounted onto said vibrator means, said platform including:

a load section for accepting unique parts in bulk with fiber oriented to impart movement of said parts in a general first direction;

a first compound inclined ramp section with fiber oriented to impart movement of said parts in a general second direction and being inclined to cause non-singulated parts to fall and return to said load section;

a second drop off ramp for accepting singulated parts from said first ramp and with fiber oriented to impart movement to said singulated parts to a desired workstation; and

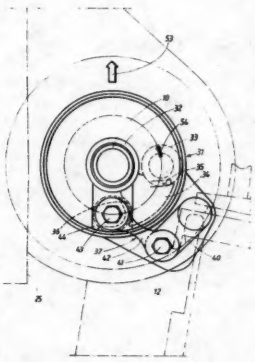
a gate between said load section and said inclined ramp whereby said gate in a closed position allowing said unique parts movement between said load section and said first ramp and said gate in said open position allowing said feeder to purge itself of said first unique part and thereafter the reclosing of said gate said feeder can be used to singulate a second unique part differing from said first unique part without further adjustment, said feeders accepting said parts in bulk from said first bin and singulating said parts to said diverting means whereby said third number of feeders is lower than said first number of bins.

4,988,257

DEVICE FOR HANDLING REFUSE

Ingemar Dahlin, Blomstermåla, and Roger Lagerqvist, Mönsterås, both of Sweden, assignors to Norba AB, Blomstermala, Sweden

Filed Aug. 21, 1989, Ser. No. 396,426
Claims priority, application Sweden, Sep. 7, 1988, 8803136
Int. Cl.[5] B65F *3/04*
U.S. Cl. 414—420 **6 Claims**



1. A refuse handling device for moving a refuse receptacle (**12**) between a lower level and a higher level and for emptying the receptacle at the higher level by tipping the receptacle, including a cradle (**11**) provided to carry at least one receptacle, a driving arrangement (**9**) for lifting and lowering the cradle, two upright units and a means (**21**) for turning the cradle between an upright receptacle position and a receptacle emptying position, comprising:

an axle (**10**), carrying the cradle, the axle being raisable and lowerable transverse to a longitudinal direction, and rotatable;

the axle has wheels (**8**) at its ends which are non-rotatably connected with the axle;

each of the wheels rotatably journalled in a respective car (**6, 7**), each of the cars being provided to run in a respective elongated guide arrangement (**25**);

at least one of the cars driven by said driving arrangement (**9**) by said at least one car being subjected to a force which is generally directed in a longitudinal direction of the guiding arrangement for causing said lifting and lowering motion;

each of the wheels being in contact with and engaged by a respective drive track (**26**) which extends along a corresponding guide arrangement, the wheels being caused to rotate by engagement with said track and by an effect of said force on at least one of the cars for turning the axle

during its rising and lowering motion in such a way that the rising and lowering motion of the axle takes place during parallel displacement of the axle; and

the cradle coupled with said axle via a cradle tipping means (31), said cradle (11) being rotatably journalled on said axle, so that the cradle only performs a limited turning motion together with the axle, whereby the cradle and thereby the refuse receptacle are tipped at said higher level from a generally upright position at said lower level,

said cradle tipping means (31) including a driver means (33), adapted to constantly turn together with the wheels (8), and a tripping member (34), provided to turn together with the cradle, wherein said driver means is provided to carry said tripping member along with it over a predetermined angular interval of a turning motion of the driver means; and

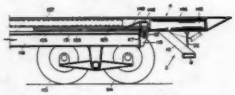
said two upright units (1, 2), each provided to be mounted on a respective side of an opening (3) into a collection container (4), and in that each of the upright units carries said guide arrangement (15), said driving arrangement and said drive track (26), said driving arrangement includes a piston/cylinder arrangement comprising an immobile member and a mobile member and controlled by a pressure medium and secured by said immobile member in one end of the upright unit, each car being securely connected with the movable member of each piston/cylinder arrangement, each movable member being guided along an upright unit.

4,988,258

CAR CATCHER

Theodore A. Lutz, Box 211, Ingomar, Pa. 15127, and Frank K. Ludwin, Box 283, South Heights, Pa. 15081

Filed Aug. 11, 1989, Ser. No. 392,831
Int. Cl.[5] B60R *19/02*
U.S. Cl. 414—500 **3 Claims**



1. The combination of a roll-off hoist structure having first and second end portions and apparatus for substantially preventing passage of a first vehicle under said second end portion when said roll-off hoist structure is in a first substantially horizontal position, said roll-off hoist structure being mounted to a second vehicle and said second end portion protruding rearwardly beyond rear wheels of said second vehicle, said combination comprising:

means mounted to said second vehicle for vertically pivoting said hoist structure about a horizontal axis between said first substantially horizontal position and a second position in which said first end portion is upwardly inclined and said second end portion is downwardly inclined;

frame means attached to said second end portion;

means for positioning said frame into an operative position and an inoperative position, said means for positioning being operable to position said frame means either into said operative position or said inoperative position at such time when said roll-off hoist structure is in said first position;

spaced-apart chains connected at first ends thereof to said roll-off hoist structure and at second ends thereof to said frame means, said spaced-apart chains preventing positioning of said frame means into a position beyond said operative position and serving to transmit collision impact energy imparted thereto by said first vehicle into said roll-off hoist structure of said second vehicle,

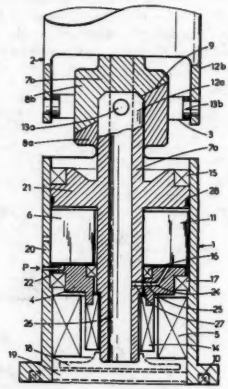
whereby at such time when said roll-off hoist structure is in said first position said frame means is positionable either into said inoperative position or said operative position, said operative position substantially preventing, during a collision between said first and second vehicles, said passage of said first vehicle under said second end portion; and prior to such time that said roll-off hoist structure is pivoted from said first position to said second position said frame means is positioned into said inoperative position to permit full downward inclination of said second end portion such that a distal end thereof is capable of being positioned substantially at ground level.

4,988,259

MODULAR MANIPULATION ARM

Maurice Gabillet, 146 rue du Château, 92100 Boulogne-Billancourt, France

Filed Mar. 1, 1989, Ser. No. 317,513
Claims priority, application France, Mar. 7, 1988, 88 02860
Int. Cl.[5] B25J *17/00*
U.S. Cl. 414—729 **9 Claims**



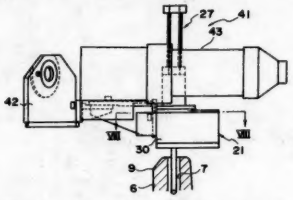
1. A manipulation arm comprising a series of articulated elements wherein at least one element is formed at least partially as a hollow body, a successive first and second element of the series each having one axis and being linked to one another by a coupling means allowing the first element to pivot about a pivot axis which meets the axis of the first element and which meets the axis of the second element obliquely at the same point, said first and second elements each having a rigid driveshaft portion within and coaxial relative to the corresponding element, these portions being linked to one another by means of an articulated connection and each being linked to the corresponding element by connection means which make it possible to rotate a portion at will and immobilize it at will in relation to the corresponding element, said connection means comprising a rotary jack, of which one cylindrical wall is formed by the inner face of the element and one axial wall is fixed to the element, the other cylindrical wall being formed by the outer face of the shaft portion and the other axial wall being fixed to the shaft portion, and a distributor capable of connecting a chamber of the rotary jack to a source of pressurized fluid or to a pressure discharge means and of isolating said chamber.

4,988,260

AUTOMOBILE DOOR OPENING/CLOSING EQUIPMENT

Hiroshi Kiba, and Yutaka Shintaku, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 23, 1988, Ser. No. 250,486
Claims priority, application Japan, Sep. 30, 1987, 62-244165
Int. Cl.[5] B25J *19/02*
U.S. Cl. 414—744.1 15 Claims



1. A device for opening and closing an automobile door having a glass slot and an upper edge with a predetermined shape, comprising:

a robot arm which is movable in a horizontal plane towards and away from the door and which includes a lower surface;

a non-contact type sensor means attached to said robot arm for detecting the predetermined shape of the upper edge of the door;

an engaging rod attached to said robot arm and adapted to move relative thereto in a vertical direction between an extended position in which said rod is inserted in the glass slot and a retracted position in which said rod is retracted from the glass slot; and

rod drive means for selectively driving said engaging rod relative to said robot arm between said extended position and said retracted position, said rod drive means comprising a vertically disposed cylinder having a piston with a piston rod connected to said engaging rod;

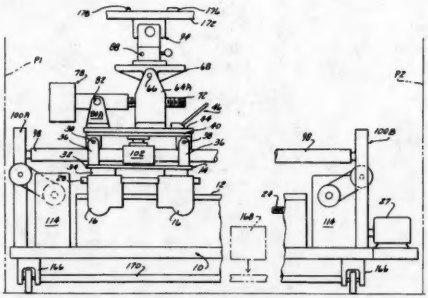
whereby when said engaging rod is in said retracted position, said robot arm can be moved in the horizontal plane so as to position the lower surface of said robot arm proximate the upper edge of the door.

4,988,261

MULTIPLE MOTION TRANSFER APPARATUS

John A. Blatt, 22 Stratton Pl., Grosse Pointe Shores, Mich. 48236

Filed Oct. 6, 1989, Ser. No. 418,257
Int. Cl.[5] B65G *35/00*
U.S. Cl. 414—749 13 Claims



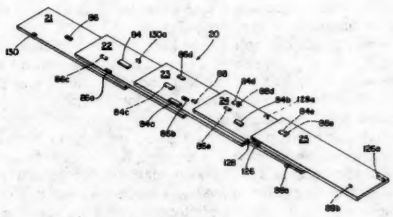
1. Article transfer apparatus comprising an elongate frame including longitudinally extending main guide rail means and first and second transversely extending secondary guide rail means located respectively at the opposite ends of said main guide rail means, first and second support block means slidably mounted on the respective first and second secondary guide rail means for sliding along respective first and second paths extending movement transversely of said frame, first and second independently operable power drive means on said frame coupled respectively to said first and second support block means for locating said first and second support block means at independently selected positions on their respective first and second paths, an elongate rigid guide member, coupling means at each end of said guide member mounting the respective ends of said guide member upon said first and said second support block means for movement therewith transversely of said frame, shuttle means mounted on said frame for movement along said main guide rail means between the opposite ends thereof, article carrier means mounted on said shuttle means for movement relative to said shuttle means transversely of said frame, and sleeve means on said carrier means received on said guide member for sliding movement longitudinally along said guide member and operable to position said carrier means transversely of said frame in accordance with the position of said guide member relative to said main guide rail means established by said first and second support block means.

4,988,262

EXTENDED REACH SHUTTLE

Paul K. Gines, Bountiful, Utah, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jul. 24, 1989, Ser. No. 383,491
Int. Cl.[5] B65G *1/04*
U.S. Cl. 414—749 5 Claims



1. In a shuttle assembly operable between a retracted condition and an extended condition to move a load, comprising a stationary element; a plurality of elongated elements movable relative to one another in a generally horizontal plane, said movable elements comprising one or more intermediate elements and a load carrying element; and drive means interconnecting said stationary and movable elements and operable to move said movable elements telescopically to extend said load carrying element to a position remote from said stationary element; the improvement comprising interacting means operable to cause said movable elements to move in a predetermined sequence when said shuttle assembly is operated between a retracted condition and an extended condition, the interacting means comprising a stop member on a first of said elements, said first element being either said stationary element or one of said movable elements; a latch attached to a second one of said movable elements adjacent said first element, said latch including a movable member normally engageable with said stop member to prevent relative movement between said first and second elements, a release member connected to said moveable member and operable to disengage said moveable member from said stop member; and a first cam member mounted on a third one of said movable elements adjacent said second element, said first cam member being positioned to engage said release member to move it to a position disengaging said movable member when said third element reaches a predetermined extension relative to said second element wherein the interacting means is operable to cause the second and third elements to extend sequentially starting with the third element, the second element being maintained stationary

until the third element reaches the predetermined position wherein all of said elements are disposed in a vertically stacked relationship when said shuttle assembly is in its retracted condition, the load carrying element being the uppermost and the stationary element being the lowermost.

4,988,263

APPARATUS FOR THE DESTACKING OF PALLETS

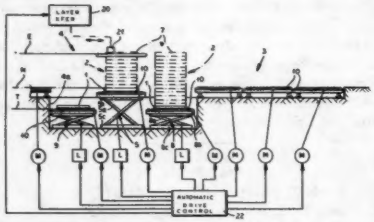
Heinz F. Odenthal, Zülpich, Fed. Rep. of Germany, assignor to Ostma Maschinebau GmbH, Zülpich, Fed. Rep. of Germany

Filed Oct. 16, 1989, Ser. No. 422,391

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3835268

Int. Cl.[5] B65G 59/02

U.S. Cl. 414—795.8 6 Claims



1. An apparatus for destacking pallets stacked with stackable elements, apparatus comprising:

a supply conveyor for feeding pallets carrying respective stacks in succession to a destacking station;

means at said destacking station for successively removing said elements from a stack at a predetermined destacking level above the respective pallet;

a vertically displaceable destacking platform receiving a stack-carrying pallet and disposed below said means for moving for raising a stack-carrying pallet to lift said elements successively to said level and for lowering an empty pallet from which said elements have been removed;

a raisable and lowerable receiving platform upstream of said destacking platform and interposed between said supply conveyor and said destacking platform for receiving a stack-carrying pallet in readiness while the stack-carrying pallet on said destacking platform is being destacked, said receiving platform being alignable with said destacking platform at a lowest level thereof for transferring said stack-carrying pallet in readiness to said destacking platform after said empty pallet has been discharged from said destacking platform; and

a discharging conveyor positioned to carry off said empty pallet from said destacking station.

4,988,264

APPARATUS FOR HANDLING MATERIAL

Ernest P. Winski, Oshkosh, Wis., assignor to Kinetic Robotics, Inc., Menasha, Wis.

Continuation of Ser. No. 888,511, Jul. 23, 1986, abandoned. This application Feb. 8, 1989, Ser. No. 309,044

Int. Cl.[5] B65G 59/02

U.S. Cl. 414—196 10 Claims

1. Depalletizing apparatus for removing a load of material from a pallet, the load comprising at least one layer having a trailing surface, said trailing surface having a height dimension and a width dimension, comprising:

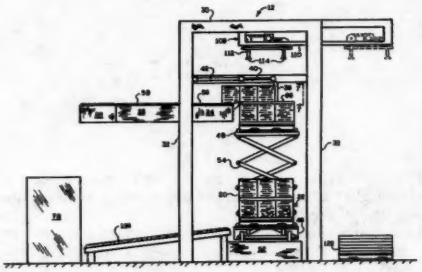
(a) means for pushing the load in a predetermined direction from the pallet one layer at a time at a predetermined feed location, said pushing means having a substantially continuous pushing surface

(1) having height and width dimensions generally coextensive with those of said load layer trailing surface, and,

(2) having a lower edge and a plurality of laterally spaced fingers depending from said lower edge,

(b) a spacing sheet under each layer of said pallet load, said sheet having an upwardly facing surface provided with a plurality of generally parallel spaced channels thereacross and with uppermost sheet portions therebetween disposed against the bottom surface of a load layer thereon, said channels being disposed in general alignment with said predetermined load pushing direction and having a spacing corresponding substantially to that of said fingers,

(c) means for positioning the pallet having the load in a predetermined load layer removal location with respect to said pushing means to dispose said lower edge of said



continuous pushing surface close to but spaced from said uppermost spacing sheet portions with said fingers engaging a minor lowermost portion of said layer trailing surface, and with said fingers extending into said channels of said spacing sheet and beneath the lower surface of said load layer, and,

(d) means precluding movement of said spacing sheet in said predetermined push direction,

whereby said load layer is readily and fully pushed from said pallet to leave said spacing sheet thereon for subsequent handling.

4,988,265

PLATE PUSHING DEVICE MOUNTED ON A HORIZONTALLY MOVABLE CARRIAGE

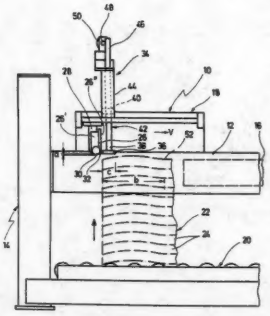
Burkhard Schwab, Calw-Alzenberg, and Erwin Jenkner, Gechingen, both of Fed. Rep. of Germany, assignors to Holzma-Maschinenbau GmbH, Calw-Holzbronn, Fed. Rep. of Germany

Filed Jan. 12, 1990, Ser. No. 464,288

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901537

Int. Cl.[5] B65G 59/02

U.S. Cl. 414—796.8 2 Claims



1. A plate pushing device for use with woodworking machines, such as plate saws, for pushing at least one workpiece plate of a stack of workpiece plates resting on a lifting platform, along a forward feed direction, into said woodworking

machine, the height of said lifting platform being adjustable by a lifting device to vary the number of workpiece plates to be pushed during a particular pushing operation, said plate pushing device being operably arranged upon a horizontally-movable carriage, said plate pushing device comprising:

a pushing element operably arranged on said carriage for vertical movement thereon, said pushing element being configured to be applied to an edge of said at least one workpiece plate;

a support roller operably coupled to said pushing element for simultaneous substantially free vertical movement relative to said carriage;

a portion of said support roller extending downwardly a predetermined distance below a lowermost portion of said pushing element;

said support roller supporting said pushing element, said support roller riding along an upper surface of an uppermost remaining workpiece plate of said stack remaining upon said lifting platform during said particular pushing operation to follow any surface irregularities thereon and to effect vertical movement of said pushing element during said pushing operation of said plate along said forward feed direction, so as to maintain said pushing element spaced at least said predetermined distance above said upper surface of said uppermost plate;

a measuring device including a vertically adjustable information element operably arranged on said carriage and operably associated with said lifting platform for detecting the height of said lifting platform and sending a signal to said lifting device, upon attainment of a preselected height, to instruct said lifting device to cease said lifting movement; and

said information element is operably arranged on said carriage, forward of said pushing element, relative to said forward feed direction.

4,988,266

GAS TURBINE AND SHROUD FOR GAS TURBINE

Shigeyoshi Nakamura, Katsuta; Yutaka Fukui, and Tetsuo Kashimura, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,880
Claims priority, application Japan, Mar. 14, 1988, 63-58326
Int. Cl.[5] F01D *5/20, 9/00*
U.S. Cl. 415—173.1 **18 Claims**

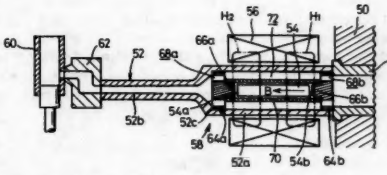
1. A gas turbine comprising moving turbine blades rotated by high-temperature gas, and a segment-shaped shroud provided in a spaced-apart relation to the tips of said moving blades, at least a sliding portion of said shroud, which sliding portion is in a sliding relation to said moving blades, being made of a heat-resistant cast alloy having a tensile strength of not less than 40 kgf/mm^2 and an elongation of not less than 5% both at a room temperature, a tensile strength of not less than 20 kgf/mm^2 and an elongation of not less than 5% both at 760° C., and a creep rupture time of not less than 10 hours under the conditions of 871° C. and 5.5 kgf/mm^2.

4,988,267

ELECTROMAGNETIC PUMP

Sadayoshi Yamada, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,688
Claims priority, application Japan, Nov. 12, 1987, 62-284225
Int. Cl.[5] H02N *4/20*
U.S. Cl. 417—50 **17 Claims**



1. An electromagnetic pump comprising:

a unitary cylindrical core made of a magnetic material;

a core protection tube housing said cylindrical core for protecting the core from erosion by contact with molten metal;

a duct accommodating said core protection tube, a space defined between said duct and said core protection tube;

a coil disposed around said duct and energizable for generating a moving magnetic field to feed molten metal filed in said space; and

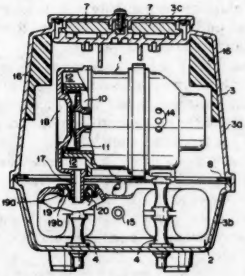
a pair of support members supporting said core protection tube in said duct and having confronting end faces, respectively, for holding opposite ends of said core, said support members being fitted in said duct and having openings for passage of the molten metal therethrough and projections fitting, respectively, in opposite ends of said core protection tube, said core projection tube and said support members jointly defining a core storage region therebetween, said core being freely movably supported with gaps left axially and diametrically between said core and said core storage region.

4,988,268

AIR COMPRESSOR

Naoya Kurihara, Tokyo, Japan, assignor to Man Design Co., Ltd., Tokyo, Japan

Filed Nov. 3, 1989, Ser. No. 431,096
Claims priority, application Japan, Nov. 10, 1988, 63-146996
Int. Cl.[5] F04B *19/22, 11/00;* **F01N** *7/16*
U.S. Cl. 417—312 **8 Claims**



1. An air compressor comprising:

a compressing section for compressing air and for thereby providing a source of pressurized air;

a pulsation-absorbing tank isolated from the compressing section for receiving pressurized air from said compressing section;

a nozzle, provided with one of the compressing section and the pulsation-absorbing tank for introducing the compressed and pressurized air from the compressing section into the pulsation-absorbing tank; and

a nozzle seal provided operatively with another one of the compressing section and the pulsation-absorbing tank and having a hole defined within a central portion thereof, said nozzle having one end which is inserted into the hole defined within the nozzle seal so that said nozzle seal is in sealing contact with an outer periphery of said nozzle, wherein

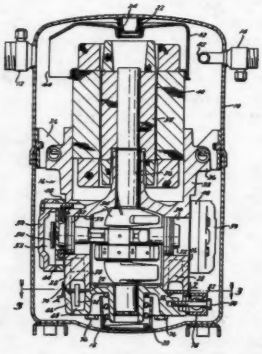
said nozzle seal includes flexible sealing means that is acted upon by pressure of said pressurized air contained in one of the compressing section and pulsation-absorbing tank and, in response to said pressure of said pressurized air, is flexibly urged into greater sealing contact with said outer periphery of the nozzle.

4,988,269

COMPRESSOR DISCHARGE GAS SOUND ATTENUATION

Jaroslav Blass, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Feb. 8, 1990, Ser. No. 476,812
Int. Cl.[5] F04B *11/00*
U.S. Cl. 417—312 **18 Claims**



1. A hermetic compressor with discharge gas sound attenuation, comprising:

(a) a hermetic shell;

(b) a motor mounted in said shell;

(c) a compressor mounted in said shell, said compressor having a plurality of pumping cylinders, each having an inlet and an outlet and having disposed therein a pumping member powered by said motor;

(d) inlet means for placing a source of suction gas in fluid communication with each said inlet;

(e) a cylinder head associated with each said cylinder and having a discharge chamber therein for receiving pumped discharge gas from said outlet;

(f) a body having a plurality of separate cavities therein, each cavity having an inlet opening in fluid communication with only one of said discharge chambers;

(g) a discharge gas plenum member defining a single discharge gas plenum in communication with all of said cavities;

(h) a partition disposed between each said cavity and said plenum.,

(i) an impedence tube extending through said partition with one end extending into said cavity and the opposite end extending into said plenum, said impedence tube being the sole means of fluid communication between said cavity and said plenum; and

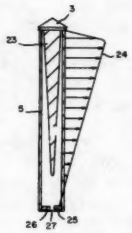
(j) outlet means for communicating discharge gas from said plenum to outside of said shell.

4,988,270

APPARATUS FOR COOLING AND CONDITIONING MELT-SPUN MATERIAL

Werner Stibal, Trimmis, and Albert Blum, Domat/Ems, both of Switzerland, assignors to Ems-Inventa AG, Domat/EMS, Switzerland

Division of Ser. No. 363,434, Jun. 7, 1989, which is a continuation of Ser. No. 60,056, Jun. 9, 1987, abandoned, which is a continuation-in-part of Ser. No. 908,040, Sep. 16, 1986, Pat. No. 4,756,679. This application Jul. 25, 1989, Ser. No. 384,768
Int. Cl.[5] B29C *71/00*
U.S. Cl. 425—72.2 **6 Claims**



1. An apparatus for spinning filaments from a melt which comprises a nozzle plate having a plurality of passages to permit said melt to flow therethrough to form a stream of said filaments, a dispersing head downstream of said plate and in said stream, said head being substantially in the form of a cylinder with its axis substantially parallel to said stream and having an inner guide in an upstream end and a downstream end followed by a coating means, a coolant source, a coolant inlet connecting said coolant source with said head at the downstream end a wall of said head being substantially parallel to said stream and being porous, whereby coolant passes through said wall and impinges on said filaments, a baffle is provided in the downstream end of said dispersing head and has a central aperture to reduce the pressure of said coolant adjacent to the baffle, whereby the porosity of said head provides a resistance to flow of said coolant satisfying the relationship

$$1.43\times10^{-6}m+2222m^2=\Delta p\leqq-96.96m+20202m^2$$

wherein $\overline{m}$ is the rate of flow of said coolant across the area of said wall in kg/h-cm^2 and Δp is the pressure drop in Pa.

4,988,271

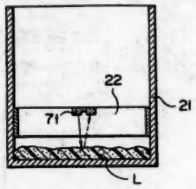
APPARATUS FOR PRODUCING POLYURETHANE FOAM

Sadao Kumasaka; Satomi Tada; Koretoshi Katsuki, all of Tokyo; Osamu Fujii, Konosu; Tutomu Yamamoto, Kawagoe; Ryoji Nagamine, Hidaka; Kazuo Hashimoto, Kawagoe; Masao Idei, Kawagoe; Yosuke Sato, Kawagoe, and Kazuo Ibata, Kawagoe, all of Japan, assignors to Human Industry Corporation, Tokyo, Japan

Filed Jul. 7, 1987, Ser. No. 70,774
Claims priority, application Japan, Dec. 25, 1986, 61-307683; Mar. 12, 1987, 62-37415; Mar. 12, 1987, 62-57416; Mar. 12, 1987, 62-57417; Mar. 12, 1987, 62-57418; Mar. 12, 1987, 62-57419
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.
Int. Cl.[5] B29C *39/42, 39/44*
U.S. Cl. 425—73 **2 Claims**

1. A batch type foaming apparatus for producing a urethane foam slab comprising a cylindrical foaming mold contained

within a vacuum chamber, said mold having a flat bottom, sides perpendicular to the bottom, and an open top, a cylindrical lifting jig opened at opposite ends, and said jig having a wall elevationally movably provided along the inner surfaces of the side walls of said mold to provide a foaming chamber between said movable wall and said flat bottom, a plurality of rotational shafts at an equal speed horizontally above said container, sprockets provided at the shafts for synchronously rotating the shafts at an equal speed and sprocket chains wound between the sprockets, and lifting wires connected at one end to an upper end of said jig and at the other end to the



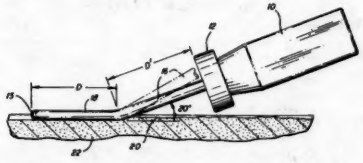
shafts, thereby rotatably driving the shafts to wind up the wires when pouring and foaming a foamable polyurethane reaction mixture in said mold to lift said jig synchronously with the rise of the top surface level of said reaction mixture, and ultrasonic sensor means coupled to the jig for detecting a distance between the sensor means and the surface level of said reaction mixture to operate the driving means when the distance between the sensor means and the rising surface of the reaction mixture comes within a predetermined value, thereby lifting the jig synchronously with the rising velocity of the reaction mixture.

4,988,272

GROUT COMPRESSING AND FINISHING TOOL

Kenneth J. Nolan, P.O. Box 42, Gilbertsville, N.Y. 13776

Filed Mar. 6, 1989, Ser. No. 318,829
Int. Cl.[5] B28B *1/29*; B05C *17/10/17/12*
U.S. Cl. 425—087 **5 Claims**



1. A tool for compressing and finishing grout in joints between adjacent tegular elements applied to a surface, said tool comprising:

(a) a handle portion having a longitudinal axis and adapted to be gripped for manual manipulation of said tool; and

(b) an elongated shaft portion of constant circular cross-section throughout its length, including:

(i) a proximal section fixedly attached to said handle portion and extending linearly therefrom along said longitudinal axis; and

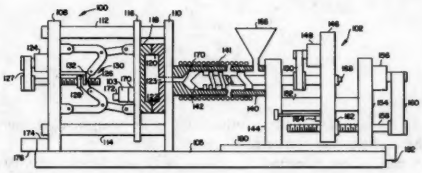
(ii) a distal section of substantially shorter length than the linear combination of said handle portion and said proximal section, extending integrally from said proximal section along a linear axis arranged at a predetermined acute angle with respect to said longitudinal axis, said distal section having a surface positioned and configured for contact with said grout to compress and smooth said grout into said joint in a substantially concave shape as said tool is drawn along said joint, said distal section having a free end of the same diameter as said elongated shaft portion, said free end being smoothly rounded such that said free end is especially useful in compressing and smoothing said grout into an inside corner when two or more tegular surfaces are in a normal and multi-planar relationship to each other.

4,988,273

INJECTION MOLDING MACHINES HAVING A BRUSHLESS DC DRIVE SYSTEM

Harold J. Faig, Cincinnati, and Ronald M. Sparer, Madeira, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jun. 23, 1989, Ser. No. 370,669
Int. Cl.[5] B29C *45/77*
U.S. Cl. 425—145 **9 Claims**



1. An injection molding machine for producing a molded part by injecting a molten material into mold elements having a mold cavity defining the molded part, the machine comprising:

(a) clamp means for supporting the mold elements;

(b) injection means for injecting the molten material into the mold cavity, said injection means including a screw member rotatably and translatably carried in a tubular barrel, said tubular barrel having an end in communication with the mold cavity;

(c) first drive means mechanically coupled to the clamp means for imparting relative motion between the mold elements;

(d) second drive means mechanically coupled to the injection means for rotating the screw member;

(e) third drive means mechanically coupled to the injection means for translating the screw member within the tubular barrel;

(f) wherein at least one of the first drive means, the second drive means and third drive means further includes

(i) a brushless DC motor producing an electromotive force having an approximately trapezoidal waveform, said motor comprising a rotor having permanent magnets and stator windings surrounding said rotor, detecting means for detecting angular positions of the rotor, and

(ii) motor controller means for controlling the brushless DC motor, said motor controller means connected to the brushless DC motor and responsive to a motor command signal, said motor controller means including

(1) supplying means for supplying positive and negative DC signals,

(2) switching circuit means for applying the positive and negative DC signals to the stator windings, said switching circuit means connected between the stator windings and the supplying means, and

(3) control circuit means connected to the switching circuit means and the detecting means for activating the switching circuit means to selectively apply the positive and negative DC signals in a predetermined phase relationship to the stator windings to produce a commutation effect thereby creating a torque on the rotor to produce rotor rotation; and

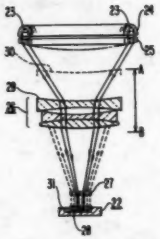
(g) machine control means connected to the motor controller means for producing the motor command signal.

4,988,274

METHOD AND APPARATUS FOR PRODUCING AN OPTICAL ELEMENT

Kazuei Kenmochi, Hirakata, Japan, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 21, 1988, Ser. No. 287,087
Claims priority, application Japan, Dec. 21, 1987, 62-323123
Int. Cl.[5] B29C *35/08*
U.S. Cl. 425—174.4 9 Claims



1. An apparatus for producing a plastic optical element, which apparatus comprises:

a mold having spaced-apart sides between which a cavity is defined in a shape corresponding to the shape of an optical element to be produced, and a feed passage open to said cavity at a portion of the periphery of said cavity, at least one of said sides being made of a light-transmittable material;

light source means for emitting a ring-like light capable of causing a photocuring reaction to occur in liquid material from which the optical element is to be formed in said cavity by the apparatus;

a variable power lens disposed in an optical path between said light source means and said mold for focussing the ring-like light emitted by said light source means along said optical path such that the center of the ring-like light is substantially aligned with the center of said cavity, the distance between said variable power lens and said mold establishing the diameter of the ring-like light as taken substantially through the center of said cavity; and

means for changing the distance between said variable power lens and said mold by an amount sufficient to allow the ring-like light emitted by said light source means to be focussed at substantially the center of said cavity and to have said diameter thereof be continuously increased from the center of said cavity as said distance is changed until the ring-like light is irradiated at the periphery of said cavity.

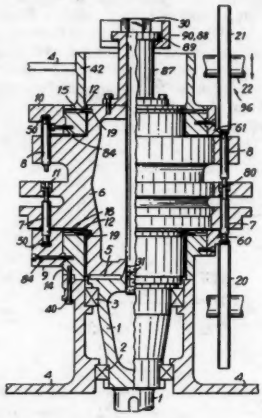
4,988,275

ROTARY PELLETIZING MACHINE

Juergen Hinzpeter; Christian Medicus, and Siegfried Franke, all of Schwarzenbek, Fed. Rep. of Germany, assignors to Firma Wilhelm Fette GmbH, Schwarzenbek, Fed. Rep. of Germany

Filed Apr. 27, 1988, Ser. No. 187,079
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1987, 3714031
Int. Cl.[5] B30B *11/08*
U.S. Cl. 425—186 12 Claims

1. A rotary pelletizing machine, comprising a housing; a pelletizing assembly located in said housing and including a rotatable matrix disc, upper and lower punches supported in said matrix disc for joint rotation therewith and for axial displacement relative thereto, upper and lower cams for controlling positions of said upper and lower punches, respectively, and means for enabling rotation of said matrix disc relative to said upper and lower cams; a drive shaft extending in said housing for imparting rotation to said matrix disc; and means for removably securing said pelletizing assembly in said housing, said removably securing means being releasable to enable



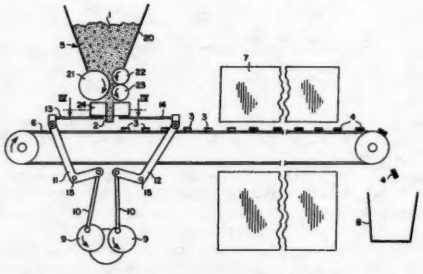
lifting of said pelletizing assembly from said drive shaft as a unit.

4,988,276

APPARATUS FOR SHAPING COOKIE DOUGH

Gerth Moeller, Kokkedal, Denmark, assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Aug. 1, 1988, Ser. No. 227,522
Int. Cl.[5] B29C *47/00*
U.S. Cl. 425—290 14 Claims



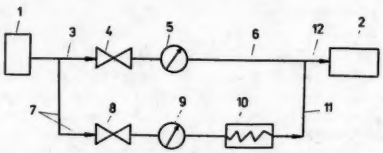
1. Apparatus for forming a cookie preform from a formed mass of cookie dough having a longitudinal axis, said apparatus comprising means for extruding a mass of cookie dough, means for perforating said mass of cookie dough transversely to said longitudinal axis, means for moving the means for perforating along the longitudinal axis of said mass of dough to stretch said mass in the area of perforation to its breaking point to thereby separate a portion of dough from the remainder of said mass of dough, the separated portion constituting said cookie preform said means for perforating being positioned relative said means for extruding such as to perforate the dough mass at a location where the dough is suspended from the means for extruding.

4,988,277

METHOD FOR CASTING POLYMERIC GELS FROM VOLATILE MIXTURES OF MONOMER IN OPEN MOLDS

Otto Wichterle, and Ivan Wichterle, both of Praha, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Praha, Czechoslovakia

Continuation of Ser. No. 852,404, Apr. 16, 1986, abandoned, which is a division of Ser. No. 718,683, Apr. 3, 1985, Pat. No. 4,609,507. This application Jun. 30, 1987, Ser. No. 68,893
Claims priority, application Czechoslovakia, Apr. 6, 1984, 2657-84
Int. Cl.[5] B29C *41/04*
U.S. Cl. 425—435 7 Claims



1. Apparatus for casting a polymeric gel into a contact lens in an open mold from a liquid polymerization mixture containing at least one volatile monomer component dissolved therein in which a protective gas is provided above the open surface of the polymerization mixture during polymerization, said protective gas prior to coming into contact with said open surface of the polymerization mixture being combined with an amount of said volatile monomer which will be in equilibrium with the volatile monomer present within the polymerization mixture under polymerization conditions, said apparatus comprising:

(a) a polymerization unit containing at least one open mold having an optical surface for casting a contact lens;

(b) a first conduit for introducing a controlled flow of protective gas to a common conduit (d); and,

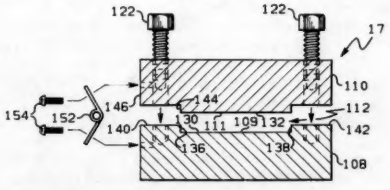
(c) a second conduit for introducing a controlled flow of protective gas containing said volatile monomer into said common conduit (d), said common conduit (d) introducing the protective gas received from first conduit (b) and the protective gas containing said volatile monomer received from second conduit (c) into polymerization unit (a).

4,988,278

PULTRUSION APPARATUS INCLUDING A MOLDING DIE

Stuart D. Mills, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 144,298, Jan. 14, 1988, Pat. No. 4,900,499. This application Sep. 22, 1989, Ser. No. 411,300
Int. Cl.[5] B29C *47/12*
U.S. Cl. 425—466 11 Claims



1. A tongue-in-groove die comprising;

a first mold half having a groove and a pair of protruding wall portions which form sidewalls for the groove, said sidewalls being separated by a predetermined distance;

a second mold half having a tongue to match the groove in the first mold half, said second mold half being juxtaposed with respect to the first mold half so as to define a wedge-shaped passage between the tongue and the groove which has an inlet and an outlet and which extends through the die from the inlet to the outlet, wherein the wedge-shaped passage converges from the inlet to the outlet and is bounded by the sidewalls for the entire length of the groove;

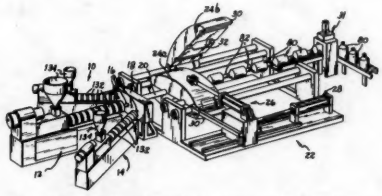
means for adjusting inlet and outlet clearance between the tongue and groove at the inlet and outlet, respectively, wherein said adjusting means is capable of adjusting the inlet and outlet clearances at the same time that the second mold half remains juxtaposed with respect to the first mold half to define the wedge-shaped passage.

4,988,279

APPARATUS FOR EXTRUSION BLOW MOLDING POLYETHYLENE TEREPHTHALATE ARTICLES

Samuel L. Belcher, Cincinnati, Ohio, assignor to Sabel Plastechs, Inc., Cincinnati, Ohio

Filed Aug. 23, 1988, Ser. No. 235,237
Int. Cl.[5] B29C *49/04, 49/34*
U.S. Cl. 425—525 41 Claims



1. An apparatus for extrusion blow molding circumferentially oriented monolayer polyethylene terephthalate articles, comprising:

(a) an extruder for extruding monolayer polyethylene terephthalate as a hollow tube, said extruder having a barrel with an input opening and an output opening, an extrusion screw disposed within said barrel, means for rotating said screw, a die head attached to said barrel at an end adjacent said output opening, and a plurality of extruder heating means for independently heating a plurality of zones of said barrel and die head to predetermined temperatures which in turn heat the polyethylene terephthalate to predetermined temperatures as it passes from said input opening to said output opening and through said die head, said screw having a tapered tip at an end adjacent said die head;

(b) means for controlling said extruder and die head heating means to establish a reverse temperature gradient along the combined length of said extruder barrel and said die head beginning at a maximum temperature at the input end of said extruder in the approximate range of 520° F–560° F. and ending at a minimum temperature at the output of said die head in the approximate range of 490° F.–520° F., to thereby increase the viscosity of the polyethylene terephthalate along the length of said extruder and establish a viscosity gradient-induced back pressure in said extruder barrel;

(c) means for imparting sufficient shear energy to the molten polyethylene terephthalate to render it substantially clear, homogenous and free of non-melted pellets at the input to said die head;

(d) a structure adjacent said extruder for supporting a plurality of traveling blow molds and means for oscillating said blow molds longitudinally on said support structure along a path colinear with the extruded hollow tube, said molds supported such that each mold faces in a direction transverse the path of the extruded hollow tube and each mold faces in the opposite transverse direction of an adjacent mold; and

(e) a plurality of traveling blow molds supported by said support structure, each said mold having means for opening and closing and each said mold positioned and configured to close around the hollow tube as it is extruded from said die head to enclose a segment thereof, to travel longitudinally away from said die head in a closed position at a rate substantially equal to the rate of extrusion of the hollow tube, to inject blow gas into the hollow tube as said mold travels away from said die head to form the desired article, to open and release the blown article, and to travel longitudinal toward said die head in an open position.

4,988,280

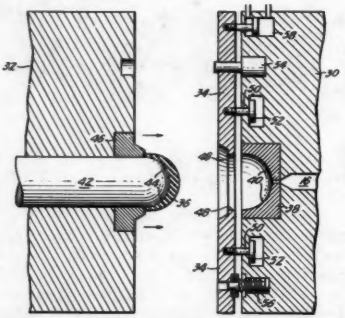
APPARATUS FOR STRIPPING A MOLDED U-SHAPED ARTICLE FROM AN INJECTION MOLD

John P. Giza, Acushnet, Mass., assignor to Acushnet Company, New Bedford, Mass.

Continuation of Ser. No. 153,103, Feb. 8, 1988, abandoned. This application Jun. 26, 1989, Ser. No. 372,224

Int. Cl.[5] B29C *45/40*

U.S. Cl. 425—556 **21 Claims**



1. In an improved mold for an injection molding machine having a first mold plate and a second mold plate, said first mold plate having a cup mold affixed therein, and said second mold plate having a mandrel affixed thereon, said mandrel in registration with said cup mold, said mandrel having an outer surface and said cup mold having an inner surface, the improvement comprising:

a cavity stripper plate movably attached to said first mold plate and positioned between said first mold plate and said second mold plate, said cavity stripper plate having a bore therethrough, said bore having a substantially smooth wall extending throughout said bore and said bore in registration with said mandrel and said cup mold such that when said mold is closed, the mandrel outer surface, the cup mold inner surface and the substantially smooth wall of said bore substantially define a closed cavity in which a molded U-shaped article can be formed, said molded U-shaped article having exterior walls substantially without exterior projections;

spring means for forcing said cavity stripper plate away from said first mold plate when said mold is opened; and

said substantially smooth wall of said bore applying mechanical interference on the U-shaped article when said mold is opened, said mechanical interference being tangential to a plane of contact between the exterior walls of said molded U-shaped article and the substantially smooth wall of said bore when said mold is opened, thereby stripping said molded U-shaped article from said cup mold and causing said molded U-shaped article to travel with said mandrel.

4,988,281

VALVE ASSEMBLY FOR INJECTION MOLDING MACHINE

William R. Heathe, Mississauga, Canada, and Hartmut Roetzel, Rameldange, Fed. Rep. of Germany, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada

Filed Sep. 7, 1989, Ser. No. 404,212

Int. Cl.[5] B29C *45/60*

U.S. Cl. 425—559 **9 Claims**

1. Injection apparatus comprising a cylindrical barrel; a rotatable and reciprocatable plasticizing feed screw in said barrel; a screw tip downstream of the feed screw and connected thereto and an outlet channel downstream of the screw tip, wherein said feed screw feeds heated thermoplastic material through said outlet channel upon reciprocation of the feed screw; a check valve assembly between said feed screw and screw tip comprising a sliding ring inside said barrel and slidable therein, a first sealing surface of said ring sealable against said feed screw and operative to block communication between the feed screw and screw tip; and means operative to seal the first sealing surface of said ring against said feed screw before reciprocation of the feed screw and upon rotation of the feed screw in one direction.

4,988,282

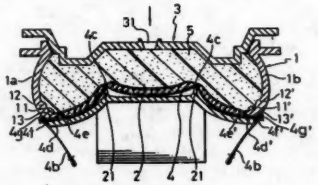
APPARATUS FOR FORMING A SEAT

Yutaka Fukui, Akishima, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,421

Int. Cl.[5] B29C *37/00*

U.S. Cl. 425—817 R **10 Claims**



1. An apparatus for forming a seat, comprising:

a lower die means on which a trim cover assembly is placed, said trim cover assembly including an outer cover member and a foam wadding;

an intermediate die means mounted on said lower die means to retain a peripheral end portion of said trim cover assembly between said intermediate die means and lower die means to define a retained area in said peripheral end portion, wherein said intermediate die means is provided at its lower end with a contact end for contact upon and pressingly retaining said peripheral end portion of said trim cover assembly against said lower die means, and further provided with a projection which extends continuously from said contact end in a direction inwardly of said intermediate die means, and terminates in a projected point disposed above a height-wise thickness of said padding of said trim cover assembly, whereupon said projection constitutes an inwardly directed lower edge of said intermediate die member;

an upper die means mounted on said intermediate die means;

said intermediate and upper die means cooperating to provide a means for forming a foam cushion member so that said lower, intermediate and upper die means are put together to define a hollow therewithin as well as above said trim cover assembly so that foaming may be effected in said hollow to thereby form said foam cushion member integrally with said trim cover assembly.

4,988,283

FUEL CELL POWER GENERATING APPARATUS AND METHOD FOR CONTROLLING THE APPARATUS

Makoto Nagasawa, and Hideyuki Miwa, both of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

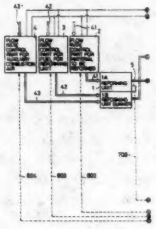
PCT No. PCT/JP89/00030, § 371 Date Sep. 12, 1989, § 102(e) Date Sep. 12, 1989, PCT Pub. No. WO89/06866, PCT Pub. Date Jul. 27, 1989

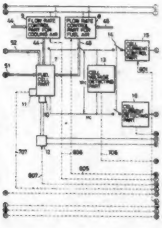
PCT Filed Jan. 13, 1989, Ser. No. 415,330

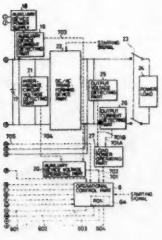
Claims priority, application Japan, Jan. 14, 1988, 63-4901; Jan. 14, 1988, 63-4902; Jan. 14, 1988, 63-4903; Jan. 14, 1988, 63-4904; Apr. 6, 1988, 63-83083

Int. Cl.[5] H01M *8/04*

U.S. Cl. 429—17 **35 Claims**







1. A fuel cell power generating apparatus which comprises a fuel cell, a fuel reforming portion for generating a reformed fuel to be supplied to the fuel cell and a heating portion for heating the fuel cell, the fuel cell generating apparatus, comprising:

a first detecting means for detecting power supplied to a load;

an operational control means for operating an electric current command signal for leading out an electric current from said fuel cell based on a first detected signal outputted from said first detecting means; and

a second detecting means for detecting an electric current outputted from said fuel cell based on said electric current command signal;

thereby the flow rate of a material which is fed to said fuel reforming portion to produce said reformed fuel being controlled on the basis of a control signal obtained by processing a second signal detected by said second detecting means with said processing means and an electric power being supplied to said heating portion on the basis of said first signal detected by said first detecting means.

4,988,284

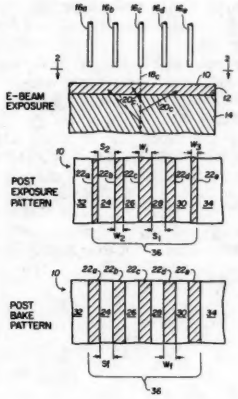
METHOD FOR COMPENSATING FOR THE E-BEAM PROXIMITY EFFECT

Hua-yu Liu, Palo Alto, and En-Den D. Liu, Mountain View, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 8, 1986, Ser. No. 916,662

Int. Cl.[5] G03F *7/26, 7/38*

U.S. Cl. 430—296 **9 Claims**



1. A method which helps compensate for the E-beam proximity effect during the production of a mask for a semiconductor substrate comprising the steps of:

forming a reactive layer over a semiconductor substrate;

exposing portions of said reactive layer with an electron beam to produce exposed portions, whereby the resultant dimensions of said exposed portions are dependent, at least in part, to their relative proximity to adjacent exposed portions due to the E-beam proximity effect;

causing a molecular migration within said reactive layer from unexposed portions thereof to adjacent exposed portions thereof, whereby the magnitude of said molecular migration to a particular exposed portion is inversely related to the magnitude of the E-beam proximity effect on that particular exposed portion, thereby at least partially compensating for the effects of said E-beam proximity effect; and

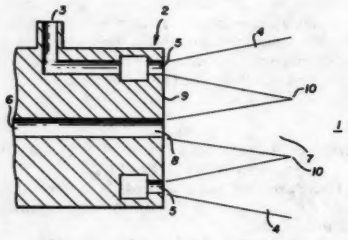
developing said reactive layer.

4,988,285

REDUCED NOX COMBUSTION METHOD

Mark A. Delano, Briarcliff Manor, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Aug. 15, 1989, Ser. No. 394,036
Int. Cl.[5] F23D *14/00*
U.S. Cl. 431—5 12 Claims



1. A method for combusting fuel and oxidant to achieve reduced formation of nitrogen oxides, comprising:

(A) heating a combustion zone to a temperature at least equal to 1500° F.;

(B) injecting into the heated combustion zone a stream of oxidant at a velocity within the range of from 200 to 1070 feet per second;

(C) injecting into the combustion zone, spaced from the oxidant stream, a fuel stream at a velocity such that the ratio of oxidant stream velocity to fuel stream velocity does not exceed 20;

(D) aspirating combustion gases into the oxidant stream and thereafter intermixing the aspirated oxidant stream and fuel stream to form a combustible mixture;

(E) combusting the combustible mixture to produce combustion gases for the aspiration of step (D); and

(F) maintaining the fuel stream substantially free from contact with oxidant prior to the intermixture with aspirated oxidant of step (D).

4,988,286

SMOKELESS IGNITOR

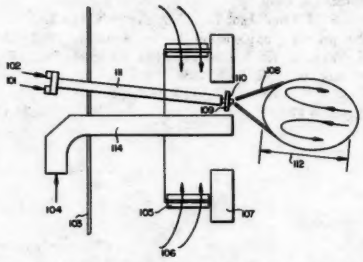
Stuart Hersh, New City, N.Y., assignor to Electric Power Technologies, Inc., Berkeley, Calif.

Filed Mar. 14, 1989, Ser. No. 323,593
Int. Cl.[5] F23C *5/28*
U.S. Cl. 431—175 13 Claims

1. A furnace comprising a main burner adapted to burn heavy hydrocarbonaceous feed comprising means to admix a liquid or solid combustible fuel with less than a stoichiometric quantity of air to form a fluidized fuel; means for mixing this fluidized fuel with additional air sufficient to at least approximate a stoiciometric mixture of fuel and air; and means for igniting said fuel; wherein said igniting means is disposed in a throat of said main burner and is also operative to heat said furnace from an ambient temperature condition to a heated operating temperature condition, while minimizing the emission of smoke to not substantially more smoke than is emitted by combustion of said fluidized fuel in said main burner after said furnace has been warmed up to operating temperature by the heating action of said ignitor, prior to ignition of the fuel in said main burner;

which ignitor means comprises:

means for feeding liquid fuel to said ignitor; means for atomizing said liquid fuel with an atomizing fluid and admixing such with combustion air into a spray, with a Sauter Mean Diameter (SMD) of less than 120 microns, and a Spatial Transport Uniformity value of +/−50% or less; means to spray said admixture into said furnace; and flame stabilizing means disposed in said furnace operatively associated with said spray means, adapted to control said sprayed admixture into a spray cone angle of 55° to 100°, said spray means and said flame stabilizing means cooperating to



spray said admixture into a recirculation zone within said furnace having a longitudinal dimension of about 0.75 to 1.5 times the diameter of said throat; said recirculation zone being so designed and operated that 20 to 25% of the mass of fluids therein are recirculated; and high energy means for igniting said sprayed mixture of liquid fuel and air to form a heating flame within said recirculation zone, whereby heating said furnace to said heated operating temperature condition by means of said flame in said recirculation zone; and,

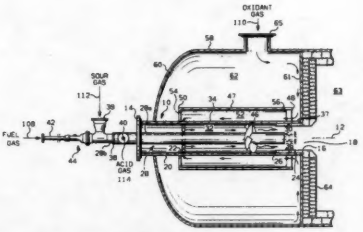
means, operative after said furnace has been heated by said flame from said ignitor to said heated operating temperature condition, for feeding said fluidized fuel and combustion air to said main burner; whereby igniting such with the flame of said ignitor whereby to operate said furnace.

4,988,287

COMBUSTION APPARATUS AND METHOD

Albert F. Stegelman, and David F. Bichler, both of Borger, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 20, 1989, Ser. No. 368,634
Int. Cl.[5] F23Q *9/00*
U.S. Cl. 431—284 27 Claims



1. An apparatus comprising:

a first hollow member having a longitudinal axis, an interior surface, an exterior surface, at least one inlet which communicates with the interior of said hollow member, and an outlet which communicates with the interior of said hol-

low member and which is longitudinally spaced from said at least one inlet;

a nozzle which comprises a first tubular member and a second tubular member positioned generally coaxially within said first tubular member so as to define a first generally annular space therebetween, said nozzle having an exterior surface, an outlet and at least one combustible gas swirl vane within said nozzle, and wherein said nozzle extends into the interior of said hollow member such that said nozzle outlet is longitudinally positioned between said at least one hollow member inlet and said hollow member outlet and such that a passageway is defined through said hollow member having a first zone defined by the exterior surface of said nozzle and the interior surface of a first portion of said hollow member longitudinally extending between said at least one hollow member inlet and said nozzle outlet, said passageway further comprising a second zone defined by the interior surface of a second portion of said hollow member longitudinally extending between said nozzle outlet and said hollow member outlet;

at least one oxidant gas swirl vane fixedly mounted within said first zone;

a first directing means for directing an oxidant gas stream in a direction generally toward said at least one hollow member inlet so as to flow along and in contact with at least a portion of the exterior surface of said second portion and then along and in contact with at least a portion of the exterior surface of said first portion;

a second directing means for directing the entirety of said oxidant gas stream through said at least one hollow member inlet and into said first zone so as to flow, in a direction generally toward said second zone, around and in contact with said at least one oxidant gas swirl vane to thereby produce a swirling stream of oxidant gas;

means for passing a first combustible gas stream through said first generally annular space and a second combustible gas stream through said second tubular member so as to flow around and in contact with said at least one combustible gas swirl vane, whereby swirling first and second combustible gas streams exit said nozzle outlet into said second zone so as to contact and mix with the swirling stream of oxidant gas in said second zone.

16. A method comprising:

(a) providing a first hollow member having a longitudinal axis, an interior surface, an exterior surface, at least one inlet which communicates with the interior of said hollow member, and an outlet which communicates with the interior of said hollow member and which is longitudinally spaced form said at least one inlet;

(b) providing a nozzle which comprises a first tubular member and a second tubular member positioned generally coaxially within said first tubular member so as to define a first generally annular space therebetween, said nozzle having an exterior surface, an outlet, and at least one combustible gas swirl vane within said nozzle, and wherein said nozzle extends into the interior of said hollow member such that said nozzle outlet is longitudinally positioned between said at least one hollow member inlet and said hollow member outlet and such that a passageway is defined through said hollow member having a first zone defined by the exterior surface of said nozzle and the interior surface of a first portion of said hollow member longitudinally extending between said at least one hollow member inlet and said nozzle outlet, said passageway further comprising a second zone defined by the interior surface of a second portion of said hollow member longitudinally extending between said nozzle outlet and said hollow member outlet;

(c) providing at least one oxidant gas swirl vane fixedly mounted within said first zone;

(d) directing an oxidant gas stream in a direction generally toward said at least one hollow member inlet so as to flow along and in contact with at least a portion of the exterior surface of said second portion and then along and in contact with at least a portion of the exterior surface of said first portion;

(e) directing the entirety of said oxidant gas stream through said at least one hollow member inlet and into said first zone so as to flow, in a direction generally toward said second zone, around and in contact with said at least one oxidant gas swirl vane to thereby produce a swirling stream of oxidant gas;

(f) passing a first combustible gas stream through said first generally annular space and a second combustible gas stream through said second tubular member so as to flow around and in contact with said at least one combustible gas swirl vane, whereby swirling first and second combustible gas streams exit said nozzle outlet into said second zone so as to contact and mix with the swirling stream of oxidant gas in said second zone;

(g) combusting said first and second combustible gas streams in said second zone to thereby produce combustion products;

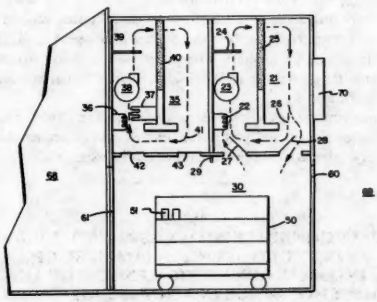
(h) discharging said combustion products through said hollow member outlet.

4,988,288

MATERIAL HEATING OVEN

Hans L. Melgaard, Minneapolis, Minn., assignor to Despatch Industries, Inc., Minneapolis, Minn.

Continuation of Ser. No. 193,876, May 13, 1988, abandoned.
This application Aug. 21, 1989, Ser. No. 398,229
Int. Cl.[5] F27B 9/04
U.S. Cl. 432—72 **6 Claims**



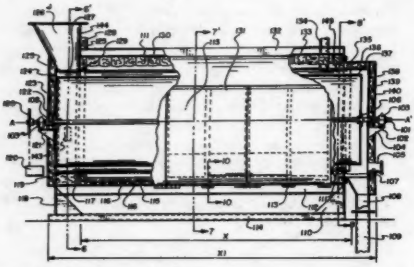
1. A material heating oven comprising an oven cavity, hot air supply means separate from the oven cavity and comprising heating means for heating air passing therethrough, a blower, a filter, and conduit means defining, with the heating means, blower and filter, an air recycling loop for recirculating air through the heater and filter at a substantially constant, controlled temperature; first controllable duct means for communicating the conduit means of the hot air supply means with the oven cavity to deliver heated, filtered air to the cavity at a controlled flow rate; first control means for controlling the temperature of the air supply to the filter of the hot air supply means; cool air supply means separate from the oven cavity and comprising a cooling element, a blower, a filter, and conduit means defining, with the cooling element, blower and filter, an air recycling loop for recirculating air through the cooling element and filter at a substantially constant, controlled temperature; second controllable duct means for communicating the conduit means of the cool air supply means with the oven cavity to deliver cooled, filtered air to the cavity; second control means for controlling the temperature of the air supply to the filter of the cool air supply means; said first and second controllable duct means including electronic control means for controlling the volumetric flow rate of air supply to the oven cavity from the hot air supply means and cool air supply means.

4,988,289

REACTION FURNACE

Robert G. Coucher, Salt Lake City, Utah, assignor to Custom Equipment Corporation, Salt Lake City, Utah

Filed Feb. 26, 1990, Ser. No. 485,387
Int. Cl.[5] F27B 7/36
U.S. Cl. 432—103 40 Claims



1. A furnace, comprising:

stationary structure including a barrel element with a stationary inner surface defining an approximately cylindrical open chamber having a central axis which is oriented substantially inclined from vertical;

heating means positioned to introduce heat to the chamber;

a shaft mounted axially with respect to said central axis to turn within said chamber;

moving structure carried by and rotatable on said shaft, including an approximately cylindrical outer surface positioned approximately concentric with respect to said inner surface and said shaft, wherein to define an approximately annular active zone within said chamber isolated from said shaft; and

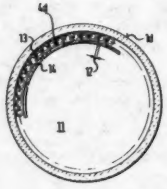
conveying means associated with said active zone for urging material from an inlet at one end of said chamber towards an outlet at an opposite end of said chamber.

4,988,290

COMBUSTION SPACE WITH A CERAMIC LINING SUCH AS IN THE COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE OR THE COMBUSTION SPACE IN A ROTARY KILN FURNACE

Siegfried Förster, Alsdorf, and Peter Quell, Aachen, both of Fed. Rep. of Germany, assignors to Forschungszentrum Jülich GmbH, Jülich, Fed. Rep. of Germany

Filed Jul. 12, 1989, Ser. No. 379,014
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1988, 3823510
Int. Cl.[5] F27B 7/00
U.S. Cl. 432—103 12 Claims



12. A ceramic lining arrangement for a combustion space comprising:

a ceramic lining;

said ceramic lining comprising an inner surface portion for being adjacent to the combustion in a combustion space and an outer surface portion being disposed away from the combustion space;

said ceramic lining comprising structures disposed within said ceramic lining between said inner and outer surface portions for forming cavities in said ceramic lining;

said cavities being at least partially covered by said inner surface portion;

means for receiving a mounting;

a flexible mounting for being received by said means for mounting; and

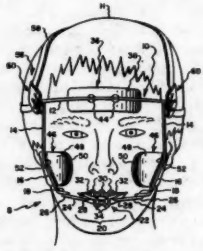
said flexible mounting also being for receiving and holding its corresponding lining.

4,988,291

ORTHODONTIC APPLIANCE AND METHOD

Duane C. Grummons, Playa DelRay, Calif., assignor to Great Lakes Orthodontics, Ltd., Tonawanda, N.Y.

Filed Nov. 28, 1988, Ser. No. 276,878
Int. Cl.[5] A61C 3/00
U.S. Cl. 433—5 27 Claims



1. An orthodontic appliance comprising:

a frame for wearing on the head of the patient and shaped to outline the area of the patient's face including the forehead, eyes, nose and mouth;

tension force applying means having two ends, said tension applying means adapted to be connected at one end to said frame forwardly of the mouth and adapted to be operatively connected at the other end thereof to selected teeth of the patient, said tension applying means exerting an outward tension force for pulling the selected teeth in a direction toward said frame; and

means carried by said frame for contacting exclusively the forward cranial so that pressure is not exerted against the lower jaw and subsequently transmitted unfavorably against the mandibular joint as it relates to the temporal bone and associated disc, said means cooperating with said tension applying means such that said means simultaneously pushes against the cranial region of the head when said tension applying means pulls the selected teeth in a direction toward said frame, thereby supporting said frame in a relatively stationary position entirely against the cranial region of the patient's head.

4,988,292

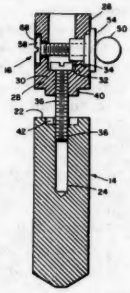
ABUTMENT FOR ORTHODONTIC ANCHORAGE TO A DENTAL IMPLANT FIXTURE

David B. Rosen, 9 Trodden Path, Lexington, Mass. 02173

Filed Jul. 26, 1989, Ser. No. 385,193
Int. Cl.[5] A61C 3/00
U.S. Cl. 433—8 16 Claims

1. For sue to benefit a patient who is endentulous at a site where orthodontic anchorage is desired, the combination of support means for an orthodontic anchoring device and an abutment for orthodontic anchorage to a dental implant fixture located at said site comprising an abutment body having at one

end means to affix said body to said implant fixture, and means rotational around an axis which traverses said body intermediate its ends to affix said support means to an external surface of said body.

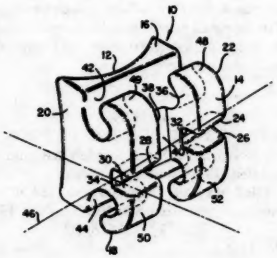


4,988,293

TOUGHNESS COATING FOR CRYSTALLINE ORTHODONTIC BRACKETS

Paul R. Collins, Washougal, Wash., and Larry R. Rothrock, Poway, Calif., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Nov. 7, 1988, Ser. No. 268,186
Int. Cl.[5] A61C *7/00*
U.S. Cl. 433—8 11 Claims



1. An orthodontic bracket comprising a body comprising a single crystalline oxide material having a base face intended to face a tooth and an opposing front face defining a longitudinal arch wire groove, and having a polycrystalline outer coating layer on at least a portion of the bracket, said polycrystalline outer coating layer being a material selected from the group consisting of alpha-alumina, zirconia, yttria, magnesia, titania, strontium titanate, rare earth oxides, Al_2O_x (x=2-3), and combinations thereof.

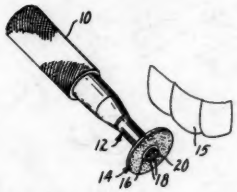
4,988,294

DETACHABLE ABRASIVE DISK

D. Robert DuBe, and Lawrence A. May, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 170,561, Jul. 21, 1980, Pat. No. 4,601,661. This application Dec. 31, 1985, Ser. No. 815,219
Int. Cl.[5] A61C *3/06*
U.S. Cl. 433—134 5 Claims

5. A dental abrasive disk comprising a flexible backing, binder, and abrasive, said disk having a central circular aperture and a grommet through said aperture, said grommet containing brass and having a continuously circular central hole



whose axis is essentially perpendicular to said disk, said grommet being firmly attached to said disk.

4,988,295

IDENTIFICATION MARKING SYSTEM FOR DENTAL INSTRUMENTS

Joseph M. Kline, 3501 N. Valley St., Arlington, Va. 22207

Filed Jan. 26, 1990, Ser. No. 471,267
Int. Cl.[5] A61C *3/00*
U.S. Cl. 433—141 6 Claims

1. A marking system for dental implements including scalers and curettes in which the implements have handles having a first cutting blade extending from one end and which blade is mounted to the handle by a first shank and wherein the implement is constructed of a metallic material comprising, at least one ring being provided in the instrument handle in spaced relationship with respect to the shank, and wherein the relative spacing of the at least one ring relative to the shank will indicate the general area of use of the first cutting blade.

4,988,296

MEDICAL APPLIANCE HOLDER

Charles M. Spencer, 2713 Prince Cir., Tuscaloosa, Ala. 35401

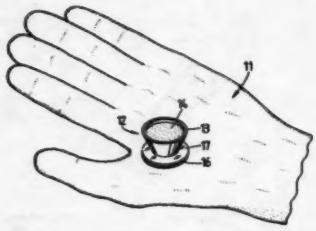
Filed Jul. 15, 1988, Ser. No. 220,453
Int. Cl.[5] A61C *3/00*
U.S. Cl. 433—163 16 Claims

1. An appliance for holding medical supplies such as instruments or medication during dental procedures comprising:

(a) glove means for covering the hand and wrist of the user forming a barrier about the hand of the user; and

(b) a deformable cup-like receptacle of sufficient size to

contain a predetermined dose of said medical supplies on the surface of said glove means for releaseably securing



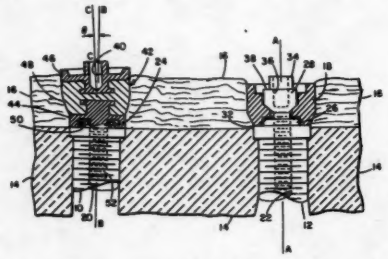
said medical supplies such that they may be selectively removed therefrom by user.

4,988,297

ALIGNMENT CORRECTOR FOR DENTAL IMPLANTS

Richard J. Lazzara, Lake Worth, and Keith D. Beaty, West Palm Beach, both of Fla., assignors to Implant Innovations, Inc., West Palm Beach, Fla.

Filed Mar. 1, 1988, Ser. No. 162,507
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 **4 Claims**



1. A parallelism corrector device for use with a dental implant that is axially misaligned relative to a desired axis, said corrector device comprising a base member adapted for connection to said implant on its misaligned axis with a prescribed orientation around said misaligned axis, connector means for removably attaching said base member to said implant with said prescribed orientation, a prosthesis-support member having means to support a prosthesis on a support axis that is fixed relative to said support member, each of said base and support members being a solid body spaced from the other and having a surface bearing a non removable interlock element projecting toward but spaced from the other member, and rigid substantially non-bendable joining means formed in the space between said surfaces embracing said interlock elements to fix said members together with an angle between said surfaces such that when said base member is so connected to said implant said support axis coincides substantially with said desired axis.

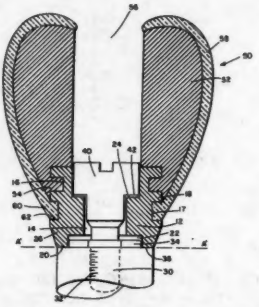
4,988,298

PRECISION ABUTMENT BASE

Richard J. Lazzara, Lake Worth, and Keith D. Beaty, West Palm Beach, both of Fla., assignors to Implant Innovations, Inc., West Plam Beach, Fla.

Filed Jan. 23, 1989, Ser. No. 299,078
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 **5 Claims**

1. An artifical tooth adapted for attachment to a dental implant fixture having a gingival surface through which a threaded bore opens into said fixture, said tooth including a coronal part and an abutment base engaged in a gingival portion of said coronal part, said base comprising a generally tubular rigid body having at one end a transverse wall precision-formed to mate with said gingival surface and a through-bore opening at a first end to said transverse wall, means within said through-bore providing an annular retainer for cooperating with screw means to fasten said body to said fixture via said threaded bore when said body is adjacent said fixture with said transverse wall confronting said gingival surface and said through-bore aligned with said threaded bore, first and second groove means around the sidewall of said body, the second



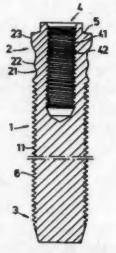
groove means being nearer to said transverse wall than the first groove means, the gingival end of said coronal part surrounding and being affixed to said sidewall via said first and second groove means, a bore in said coronal part aligned with and giving access to said through-bore, said coronal part including a metallic substructure the gingival portion of which is engaged in said first groove means, and covering said substructure an anatomical overlay which envelopes said abutment base around its sidewall nearer to said transverse wall than said substructure, the gingival portion of said overlay being engaged in said second groove means.

4,988,299

IMPLANT FIXTURE FOR TOOTH PROSTHESIS

Per-Ingvar Branemark, Mölndal, Sweden, assignor to The Institute for Applied Biotechnology, Sweden

Filed May 19, 1989, Ser. No. 354,502
Claims priority, application Sweden, May 20, 1988, 8801886
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—174 **10 Claims**



1. A fixture intended for implanting and anchoring in bone tissue to support a prosthesis, the fixture having at least a surface layer of material compatible with the bone tissue, the fixture comprising a lower shaft portion with external threading and the lower shaft portion having a core diameter, the lower shaft portion being arranged to be screwed into a hole drilled in the bone tissue, wherein the diameter of the hole in the bone tissue is substantially in agreement with the core diameter of the lower shaft portion, the fixture further com-

prising an upper, smooth, neck portion above the lower shaft portion, the diameter of the neck portion lies within the interval between the outer diameter of the thread on the lower shaft portion and the core diameter of the shaft portion, the neck portion having an upper part away from the lower shaft portion, and a substantially cylindrical head portion at the upper part of the neck portion.

4,988,300

RIDING SIMULATOR

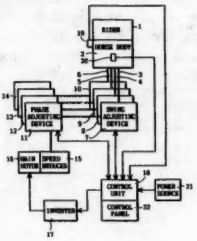
Masaaki Yamaguchi; Masashi Kito, both of Nagoya; Nobuhiro Iguchi, Tokyo; Shinzo Yoshida, Chigasaki, and Atushi Ishigure, Nagoya, all of Japan, assignors to Meitec Corporation, Nagoya, Japan

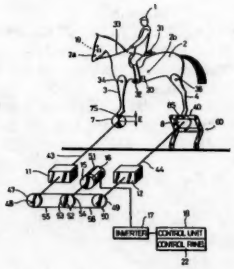
Filed Dec. 11, 1989, Ser. No. 448,356

Claims priority, application Japan, Dec. 15, 1988, 63-317160; Dec. 21, 1988, 63-322906; Jan. 17, 1989, 1-9567; Jan. 25, 1989, 1-15690; Feb. 16, 1989, 1-36570; Mar. 3, 1989, 1-52208; Mar. 4, 1989, 1-52449

Int. Cl.[5] A63B *69/00*; G09B *9/00*

U.S. Cl. 434—247 **6 Claims**





1. A riding simulator comprising:

an artificial horse body including a barrel on which a rider can ride for simulating the riding of a real horse, a neck pivotally mounted on the top front end of said barrel, a head pivotally mounted on said neck and having a rein attached thereto, a saddle mounted on a top of said barrel and having stirrups attached thereto, a right and a left foreleg pivotally mounted on the bottom front end of said barrel, and a right and a left hind leg pivotally mounted on the bottom rear end of said barrel;

first horse body supporting structures for circularly movably supporting the lower ends of the right and left forelegs of said horse body and for pivotally supporting the coupling points of the upper ends of the right and left forelegs with the barrel of said horse body;

second horse body supporting structures for circularly movably supporting the lower ends of the right and left hind legs of said horse body with the same ends held in a horizontal plane and for pivotally supporting the coupling points of the upper ends of the right and left hind legs with the barrel of said horse body;

swing adjusting devices for driving said first and second horse body supporting structures and for moving said horse body in both vertical and longitudinal directions such that the swing of said horse body is adjustable in both vertical and longitudinal directions;

phase adjusting devices for adjusting the phase difference between the vertical motion and the longitudinal motion of said horse body when said first and second horse body supporting structures are driven to move said horse body in vertical and longitudinal directions;

drive force transmitting mechanisms for transmitting drive force to said swing adjusting devices through said phase adjusting devices;

main motors for outputting the drive force to said drive force transmitting mechanisms;

a control unit for supplying drive power to said main motors for adjusting the rotational speed of said main motors and for outputting electric power to said phase adjusting devices for adjusting the phase of said phase adjusting devices; and

means for setting modes of stepping motions corresponding to a plurality of basic stepping motions of said horse body based on the swing produced by said swing adjusting devices, the phase difference produced by said phase adjusting devices and the rotational speed of said main motors, and for outputting setting signals indicative of the set modes to said control unit.

4,988,301

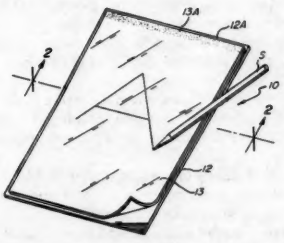
LUMINESCENT WRITING AND DISPLAY DEVICE

Benjamin Kinberg, 200 Fifth Ave., New York, N.Y. 10010

Continuation-in-part of Ser. No. 315,611, Feb. 27, 1989, Pat. No. 4,927,748. This application Nov. 8, 1989, Ser. No. 433,524

Int. Cl.[5] B43L *1/12*; G09B *11/00*

U.S. Cl. 434—410 **1 Claim**



1. An improved writing and display device for producing a semi-permanent luminescent image upon the application of a writing pressure thereon comprising

a rigid backing member formed of an inexpensive cardboard material,

said backing member having a smooth, opaque surface,

a transparent thin film of a plastic material,

said transparent film being ultra thin with a thickness in the range of 0.001 to 0.0005 inches and said ultra-thin film being adhesively secured to the opaque surface of said backing member,

a transparent plastic sheet containing a luminescent tinting material integrally dispersed throughout said plastic sheet,

said tinted transparent plastic sheet being disposed in overlying relationship to said transparent thin film,

said tinted transparent plastic sheet and said transparent thin film each having a smooth surface for direct contact at the interface thereof,

and said tinted transparent sheet being pliable so that upon the application of a pressure thereon, the respective smooth surfaces of said transparent sheet and transparent

film are urged into intimate contact at the points of applied pressure to form a luminescent image along the points of applied pressure that will be retained thereon so long as said transparent tinted sheet and said transparent film are adhered to one another along the points of applied pressure, said luminescent image being erased by effecting separation of said tinted transparent sheet and said ultra thin film,

said ultra thin film adhesively being secured to said backing member operating to minimize any electrostatic charge produced between said transparent sheet and underlying film during separation thereby eliminating any build-up of dust on the interfacing surfaces thereof,

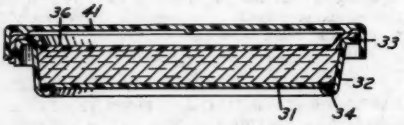
said thin film being selected from the group consisting of polyethylene, polypropylene and polyvinyl.

4,988,302

CULTURE MEDIA PACKAGE

Jerry W. Smith, and Nadine M. Sullivan, both of Ann Arbor, Mich., assignors to Difco Laboratories Incorporated, Detroit, Mich.

Filed Jun. 8, 1989, Ser. No. 363,505
Int. Cl.[5] C12M *1/22*
U.S. Cl. 435—298 **34 Claims**



1. A sterile culture media package comprising

a container having a bottom wall and a peripheral side wall,

said container having a peripheral flange extending outwardly from the peripheral side wall,

a removable insert comprising a bottomwall overlying said container and a peripheral flange extending outwardly from the peripheral side wall and overlying the peripheral flange of said container,

said package being substantially filled with a culture medium in contact and solidified in situ on the surface of the bottom wall of the insert,

said container including an integral portion defining a space adjacent the bottom wall into which gases and bubbles present after the package is filled and sealed have migrated,

said peripheral flange of said container and said peripheral flange of said insert being in contact and sealed to one another to form a sterile package.

2. The culture media package set forth in claim 1 wherein said integral portion defining a space comprises a downwardly extending peripheral groove at the area of juncture of the bottom wall of the container with the peripheral wall of the container.

4,988,303

ADJUSTABLE AGITATOR ASSEMBLY

William K. Thomas, N 11897 Deerlake, Tomahawk, Wis. 54487

Filed Jan. 23, 1989, Ser. No. 299,207
Int. Cl.[5] B01F *5/10, 5/12, 7/04, 7/22*
U.S. Cl. 366—285 **5 Claims**

1. A liquid agitator assembly for agitating liquid comprising:

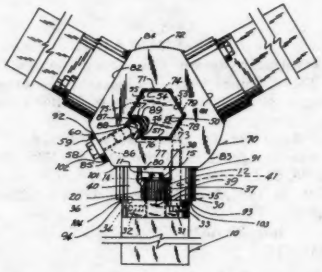
paddle means having at least one stirring surface and an end having paddle mounting means;

a noncylindrical rotatable shaft to move said paddle means;

said noncylindrical rotatable shaft having removable mounting means for said paddle means, comprising a solid single piece hub having an opening complementary to the shape of said rotatable shaft and at least one mounting receptacle having internal cavity adapted to receive and interlock with said paddle mounting means in any of a series of fixed pre-selected positions;

a plurality of fastening means securing said removable mounting means to said noncylindrical shaft;

said paddle mounting means of said paddle means also being attached by at least one said fastening means to said rotatable shaft at said removable mounting means so that said stirring surface is at a pre-selected position;



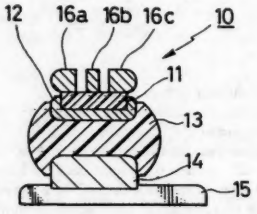
said paddle mounting means, said hub, and said removable mounting means having smooth surfaces and resilient seals along their joints with each other to exclude liquids to permit easy cleaning.

4,988,304

ELECTRODE DEVICE INCLUDING HIGH VOLTAGE SLIP-RING ELECTRODES

Kouki Kikuchi, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 4, 1989, Ser. No. 389,800
Claims priority, application Japan, Aug. 10, 1988, 63-198012
Int. Cl.[5] H01R *39/10;* A61B *6/03;* H01B *17/14*
U.S. Cl. 439—13 **5 Claims**



1. An electrode device for applying electric power to an electrical apparatus mounted on a rotary frame, comprising:

an insulating body;

first and second conductors provided on substantial portions, respectively, of a top and a bottom of the insulating body;

a insulating member mounted on said first conductor; and

plural high voltage slip-ring electrodes mounted on said insulating member and adapted to make sliding electrical connection to a plurality of slip-ring brush electrodes mounted on said rotary frame during rotating movement of said rotary frame.

4,988,305

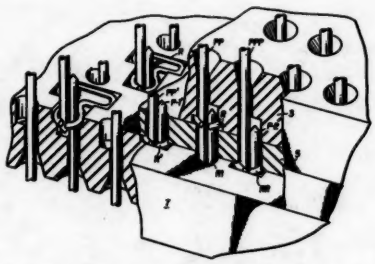
HIGH DENSITY CONNECTORS

John W. Svenkeson, Scandia, and Patrick J. Murphy, Mounds View, both of Minn., assignors to Unisys Corp., Detroit, Mich.

Division of Ser. No. 149,827, Jan. 28, 1988, abandoned. This application Aug. 5, 1988, Ser. No. 228,895

Int. Cl.[5] H01R *9/09, 13/20*

U.S. Cl. 439—65 13 Claims



1. Two-faced female connector means adapted for ohmic connection of a number of first pins projected from a first device with respective ones of second pins, projected oppositely from one or more second connectable devices, this connector means being characterized by paired bores for respective pair of oppositely-projected pins in wiping engagement; and a number of conductive gripper means, each said gripper means being adapted for so engaging a respective set of pins, and with adjacent gripper means being offset from one another in the thickness direction of the overall connector means.

with said connector means comprising a plurality of relatively planar plates, with at least one plate adapted to receive and retain a first set of gripper means, plus at least one other plate disposed adjacent said first plate, each other plate being adapted to receive and retain a respective further set of gripper means.

4,988,306

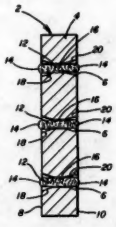
LOW-LOSS ELECTRICAL INTERCONNECTS

Albert N. Hopfer, III, Park Ridge, and Richard J. Lindeman, Wood Dale, both of Ill., assignors to Labinal Components and Systems, Inc., Elk Grove Village, Ill.

Filed May 16, 1989, Ser. No. 352,499

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—66 51 Claims



1. An electrical contact interface member of the type which includes a resilient wadded conductor contact element disposed in a cavity within an electrically nonconductive carrier component and which cavity has one end thereof open through one surface of said carrier component, with the end surface of one end portion of said wadded contact element exposed through said cavity opening, wherein said cavity is defined by wall portions of said component and comprises an inward first portion which includes means for engaging said wadded wire contact element and retaining said element in said carrier component and a second portion which extends inward through said surface toward said first portion and receives therein said end portion of said element, said second portion of said cavity being of a cross-sectional configuration and dimensions at least as large as the nominal relaxed cross sectional configuration and dimensions of said end portion of said contact element disposed therewith to allow free movement of said end portion of said element generally normal to said one surface within said second portion of said cavity, whereby said end portion of said element is free for compressive movement within said second portion of said cavity generally normal to said one surface.

4,988,307

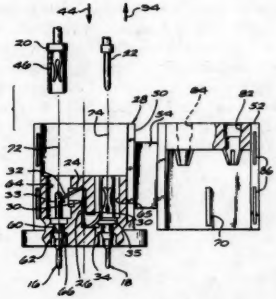
CIRCUIT SHORTING CONNECTOR

Steven Z. Muzslay, Huntington Beach, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Oct. 10, 1989, Ser. No. 419,351

Int. Cl.[5] H01R *13/703*

U.S. Cl. 439—188 9 Claims



1. In a connector system that includes a connector having first and second contacts that are matable with third and fourth contacts, said third contact being a socket contact and said first contact being a pin contact with a front part that mates with said third contact, and said first and second contacts have parallel axes lying in a common imaginary plane, the connector including a housing and a spring-operated device in the housing that short circuits the first and second contacts when they are not mated to the third and fourth contacts, the spring-operated device being deflected out of engagement with said first contact by said third contact as it moves in a direction to approach and mate with said first contact, the improvement wherein:

said spring-operated device includes a strip of spring material having a centerline extending along its length with said centerline lying substantially in said imaginary plane, said strip having opposite strip ends based against said first and second contacts, a first of said strip ends bearing against said front part of said first contact to be deflected by said third contact into the space between said first and third contacts.

4,988,308

FLOATING PANEL MOUNTS FOR ELECTRICAL CONNECTORS

Thomas N. Toedtman, Cupertino, Calif., assignor to Molex Incorporated, Lisle, Ill.

Continuation of Ser. No. 467,629, Jan. 19, 1990, abandoned. This application Jul. 23, 1990, Ser. No. 559,541

Int. Cl.[5] H01R *13/74*

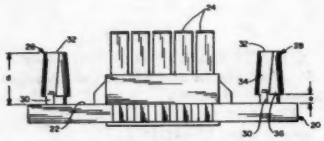
U.S. Cl. 439—248 20 Claims

16. A floating panel mount for mounting an electrical connector to a panel, said panel having at least one mounting aperture therein, said floating panel mount comprising:

a mounting flange;

a support post extending from said mounting flange, said support post having a cross-sectional dimension less than the cross-sectional dimension of the mounting aperture and a length greater than the thickness of the panel;

a generally frusto-conically shaped securing member extending generally about said support post in spaced relationship thereto, said securing member having first and second ends, said first end being adjacent to but spaced from the mounting flange by a distance slightly greater than the



thickness of the panel, the cross-sectional dimension of said first end being greater than the cross-sectional dimension of the mounting aperture, said securing member being resiliently deflectable inwardly toward said support post to define a cross-sectional dimension less than the cross-sectional dimension of the mounting aperture; and

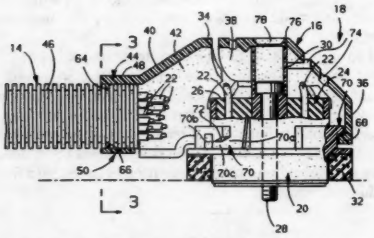
said securing member being comprised of at least one vane, said at least one vane being attached to said support post along substantially the entire length of said support post spaced from said mounting flange.

4,988,309

ELECTRICAL CONNECTOR COVER

Jay H. Garretson, Warren, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 8, 1990, Ser. No. 490,202
Int. Cl.[5] H01R *13/62*
U.S. Cl. 439—318 **7 Claims**



1. A thermoplastic electrical connector comprising:

a dome having a rim which is adapted to be secured to another electrical connector member by a bayonet joint so that an interior space of the dome forms a chamber in combination with said another connector member,

the dome being configured so that the electrical connector member acts as a tension spring which maintains the integrity of the bayonet joint when an upward force is applied to the dome by said another connector member, and

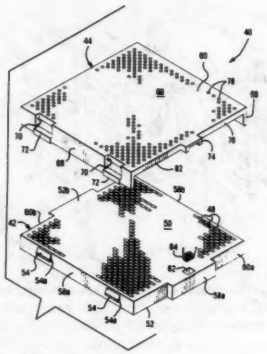
the dome having a plurality of circumferential slots which are located between a peak of the dome and the rim.

4,988,310

ZIF PGA SOCKET AND A TOOL FOR USE THEREWITH

Edward J. Bright, Middletown, and James A. Hogan, Jr., Harriburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 10, 1989, Ser. No. 419,365
Int. Cl.[5] H01R *4/52*
U.S. Cl. 439—342 **6 Claims**



1. An electrical socket for electrically connecting an electronic package having depending leads to a back plane, said socket comprising:

a base housing of insulating material and having a top surface, elongate cavities opening onto said top surface and an under surface, said elongated cavities having a wide end and a narrow end;

conductive contact elements disposed in respective cavities, said contact elements having an intermediate section located in the wide end and a cantilever beam which extends into said narrow end of said cavity from an attachment to said intermediate section, said contact elements further having means thereon extending outwardly from said under surface for electrically engaging circuits on the back plane;

a cover having openings therethrough, said cover slidably mounted on said top surface with said openings being in alignment with respective said cavities; and

a coil spring disposed in said base housing and having arm means extending outwardly therefrom for engaging and for removably biasing said cover so that said openings are in alignment with said wide end of respective said cavities sot hat leads from the electronic package may be inserted into said cavities through said openings without engaging said contact elements therein.

4,988,311

TERMINAL BLOCKS

Charles Tanzola, Long Valley, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 7, 1989, Ser. No. 447,299
Int. Cl.[5] H01R *4/24*
U.S. Cl. 439—404 **8 Claims**

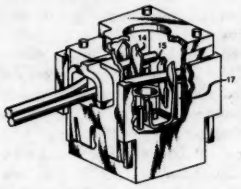
1. A terminal block comprising:

a housing including an entrance port defined therein;

a separation member including a sharp edge located at said entrance port, so as to cut an insulated pair of wires inserted at said entrance port into individual wires;

a pair of contact members situated within said housing, each contact member including an opening for insertion of a wire therein, the opening being defined by edges which are capable of piercing insulation surrounding said wire, and the contact members being aligned with the entrance port and separation member so that each individual wire

cut from the wire pair is positioned above an opening in an associated contact member; and



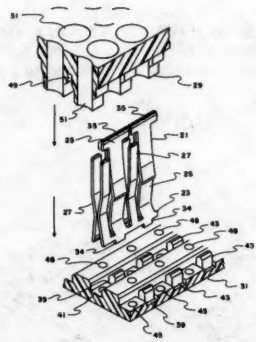
means for pressing each wire into the opening of its associated contact member.

4,988,312

COAXIAL CONNECTOR FOR CONNECTING COAXIAL CABLE CONTACTS WITH PRINTED CIRCUIT BOARDS

Takao Suzuki; Katsumi Takekawa; Tetsuro Tokaichi, and Shoji Umesato, all of Tokyo, Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of, Japan

Filed Apr. 4, 1990, Ser. No. 504,584
Claims priority, application Japan, Apr. 6, 1989, 1-39977[U]
Int. Cl.[5] H01R *4/66*
U.S. Cl. 439—581 **8 Claims**



1. In a coaxial connector comprising a first insulator, a second insulator facing said first insulator in a first predetermined direction, a contact member disposed between said first and said second insulators, and guide means for guiding a mating element which is to be connected to said contact member, said first insulator having a first principal surface, said second insulator having a second principal surface which is opposite to said first principal surface in said first predetermined direction, said contact member comprising a first and a second conductive plate which are superimposedly combined, the improvement wherein each of said first and said second conductive plates includes:

a base plate extending in a second predetermined direction which is perpendicular to said first predetermined direction; and

a first and a second contact extending from said base plate perpendicular to said second predetermined direction, said first and said second contacts being arranged alternately in parallel rows in said second predetermined direction,

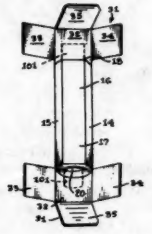
said first insulator having, on said first principal surface, a first groove extending in said second predetermined direction, said second insulator having, on said second principal surface, a pair of second grooves extending in said second predetermined direction, said first and said second contacts having end portions which are collectively accommodated in said first groove, each base plate of said first and said second conductive plates being accommodated in each of said second grooves.

4,988,313

FUSE HOLDER DEVICE

Gerald E. Castlebury, Rte. 2, Box 144C, Ruther Glen, Va. 22546

Filed Oct. 16, 1989, Ser. No. 421,904
Int. Cl.[5] H01R *13/68*
U.S. Cl. 439—621 **4 Claims**



1. A fuse holder device for fuses having electrical contact elements on their opposite ends wherein the device comprises:

a fuse housing unit including three wall members operatively associated with two apertured shoulder members;

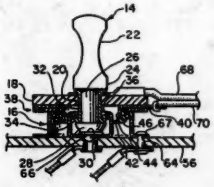
two cover units operatively attached to opposite ends of one of the said wall members wherein each cover unit comprises a rear wall element and two side wall elements.

4,988,314

CONNECTOR

Zuhdi Sardar, 688 Sante Fe, No. 110, Los Angeles, Calif. 90021

Filed Oct. 26, 1989, Ser. No. 427,022
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—628 **6 Claims**



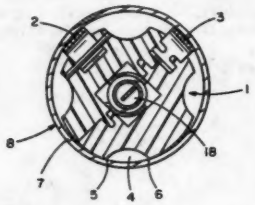
1. An electrical connector for use with wires connected to earphones for connection to a sound system, said connector comprising a plug and jack, said plug and jack each having concentric outer and inner radially spaced generally cylindrical sleeves formed from electrically conductive material for connection to the wires, formations on the peripheries of said concentric generally cylindrical surfaces, said formations on the peripheries of said generally cylindrical surfaces shaped and positioned so the said formations on the plug and jack are releasably electrically interlocked together when the plug and jack are pressed together, said plug and jack shaped so the circumferential length of the interlocked cylindrical surfaces on the plug and jack is much greater than the thickness of the interlocked plug and jack so when they are pressed together they resemble a snapjack, whereby the electrically connected peripheries of the interlocked plug and jack have a large area of electrical contact enabling them to withstand rough handling without introducing noise into the earphones.

4,988,315

ELECTRICAL ADAPTER PLUG

Richard F. Wharton, Glenview, Ill., assignor to SAFCO Corporation, Chicago, Ill.

Filed Feb. 21, 1990, Ser. No. 482,771
Int. Cl.[5] H01R *17/18*
U.S. Cl. 439—668 15 Claims



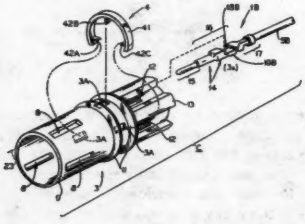
1. An electrical adapter plug having a body insertable into a mating socket sleeve to establish electrical contact between the plug and the sleeve, comprising a pair of circumferentially spaced and retractable contacts projecting beyond the periphery of the plug body to establish electrical contact between at least one contact and the sleeve in response to a retraction of the contacts and with the two contacts being angularly spaced circumferentially on the periphery of the plug less than about 150°, and a groove located on the periphery of the adapter plug body generally opposite the pair of contacts and generally centered on a line which represents an extension of the resultant force vector generated by the restriction of the two spring contacts in response to the insertion of the adapter plug into the mating socket sleeve so that at least three areas of contact exist between the adapter plug and the sleeve and with the groove having edges making circumferentially spaced line contact with the socket sleeve when the plug is inserted into the socket sleeve.

4,988,316

ELECTRICAL CONNECTOR WITH EXTERNALLY APPLIED RADIAL LOCK

Dhirendra C. Roy, Canton, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Sep. 14, 1989, Ser. No. 407,485
Int. Cl.[5] H01R *13/426, 13/428*
U.S. Cl. 439—744 15 Claims



1. An electrical connector system for connecting at least two wires to a female receptacle in a connector block, comprising:

at least two, longitudinally extended, terminal pins for insertion into the female receptacle; each of said pins having

a terminal end portion, and

a main, structurally strong, pin body, there being at least one, outwardly directed, female window opening through the exterior surface of said pin body;

a connector body having an interior and an exterior wall covering at least a part of said interior, said connector body enclosing and containing said terminal pins in its interior and having in said interior a center-line, said connector body further having separate communication openings through said exterior wall leading to said interior, each one associated with a separate one of said terminal pins, each one extending to a respective one of said terminal pins and communicating with its respective window opening; and

a separable radial lock located on the exterior of said connector body on said cylindrical portion and having a base segment and a separate inwardly directed tab extension associated with a separate one of said terminal pins extending from said base segment through said exterior wall openings and extending into said female window opening of its respective terminal pin, positively locking said terminal pin to said connector body against longitudinal movement of said terminal pin with respect to said connector body;

said exterior wall including a cylindrical exterior surface in the areas surrounding and extending past said communication openings and overlying said female window openings; and

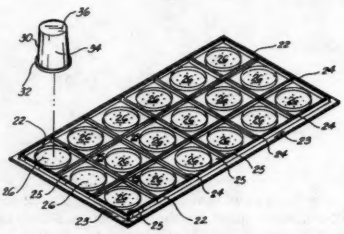
said base segment of said separable lock forming a circular arc segment presenting a continuous cylindrical surface on its underside extending past said communication openings, straddling said exterior wall about and in curved face-to-face surface engagement with said cylindrical exterior surface in the areas overlying the communication openings, said inwardly directed tab extensions being radially directed toward said center-line into their respective outwardly directed female window openings.

4,988,317

SECTIONALIZED PONTOON FLOAT

Gilbert A. Rubinsak, 15516 Dismuke Dr., N. Biloxi, Miss. 39532, and Richard Frese, 185 Iberville Dr., Biloxi, Miss. 39531

Filed Nov. 16, 1988, Ser. No. 272,110
Int. Cl.[5] B63B *35/00*
U.S. Cl. 441—46 9 Claims



1. A pontoon float further comprising:

a. a planar sheet means;

b. means for stiffening said planar sheet;

c. a plurality of float means in a symmetrical array mounted to said planar sheet;

d. said float means further comprising: substantially vertical float being restrained only at a top surface thereof;

e. means, extending along at least an edge of said planar sheet forming a detachable, rigidly interconnecting joint with a corresponding edge of a second said planar sheet means;

f. said means along said edge further comprises:

1. first, upper rectangular plate means and second, lower rectangular plate means;

2. said first and said second plate means being affixed rigidly, parallel to each other along an edge of said planar sheet, defining thereby an elongate rectilinear groove;

3. said groove being adapted to receive an edge of a second planar sheet;

4. removable means for fastening rigidly said second planar sheet within said groove.

4,988,318

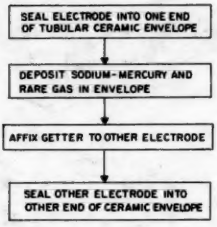
UNSATURATED VAPOR HIGH PRESSURE SODIUM LAMP ARC TUBE FABRICATION PROCESS

Philip J. White, Georgetown; John A. Scholz, Danvers, and Robert S. White, Beverly, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 807,120, Dec. 11, 1985, abandoned, which is a continuation of Ser. No. 689,028, Jan. 7, 1985, abandoned, which is a continuation of Ser. No. 473,894, Mar. 10, 1983, abandoned. This application Jan. 6, 1989, Ser. No. 294,954

Int. Cl.[5] H01J *9/00*

U.S. Cl. 445—26 **7 Claims**


SEAL ELECTRODE INTO ONE END OF TUBULAR CERAMIC ENVELOPE
DEPOSIT SODIUM-MERCURY AND RARE GAS IN ENVELOPE
AFFIX GETTER TO OTHER ELECTRODE
SEAL OTHER ELECTRODE INTO OTHER END OF CERAMIC ENVELOPE

4. In a process for fabricating an unsaturated vapor type high pressure sodium lamp, an arc tube fabricating process comprising the steps of:

affixing an oxygen-absorbing getter to at least one electrode of a pair of electrodes wherein said oxygen-absorbing getter is in the form of a zirconium-aluminum alloy sintered to an apertured split nickel plated iron substrate and said getter is affixed to the electrode by means of said apertured split substrate;

sealing one electrode of said pair of electrodes into one end of a tubular ceramic envelope;

depositing a dosing of mercury, sodium and rare gas within said envelope, said sodium and mercury each being deposited in an amount such that said sodium and mercury will be totally vaporized to provide an unsaturated vapor type high pressure sodium lamp; and

sealing the other electrode of said pair of electrodes having a getter affixed thereto into the other end of said tubular ceramic envelope with said getter disposed within and spaced from said ceramic envelope to form an arc tube for an unsaturated vapor type high pressure sodium lamp.

4,988,319

BUBBLE BLOWER

Lin Mong Sheng, No. 195, Chieng-Kou Rd., Hsintien Shih, Taipei Hsien, Taiwan

Continuation-in-part of Ser. No. 364,513, Jun. 9, 1989, abandoned, which is a continuation of Ser. No. 110,676, Oct. 19, 1987, abandoned. This application Oct. 11, 1989, Ser. No. 421,565

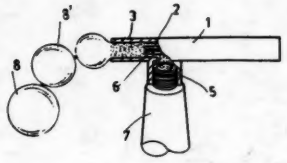
Int. Cl.[5] A63H *33/28*

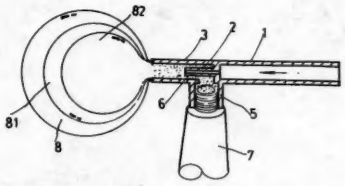
U.S. Cl. 446—19 **1 Claim**

1. An air bubble blower capable of blowing bubbles connected in series or one or more inside another consisting of:

a tube having a constant predetermined inner diameter throughout the length thereof, said tube having one end for admitting air and an opposite, output end forming a first nozzle;

a second tubular nozzle integrally disposed within the first nozzle having an input end for admitting air and an output end, the output end of said tube extending beyond the output end of said second nozzle, said second nozzle having a constant inner diameter throughout the length thereof, a predetermined length of the outer wall of said second nozzle including the output end being spaced away from the inner wall of said first nozzle; and





a socket mounted on said first nozzle and opening into the space between said first and second nozzles, said socket adapted to mount a reservoir of liquid bubble blowing material.

4,988,320

RECONFIGURABLE ANIMAL FIGURE TOY GLIDER

James Rankin, and Jack V. Miller, both of Los Angeles County, Calif., assignors to Comet Industries, Chicago, Ill.

Filed Apr. 3, 1989, Ser. No. 331,744

Int. Cl.[5] A63H *27/01, 3/00*

U.S. Cl. 446—62 **11 Claims**

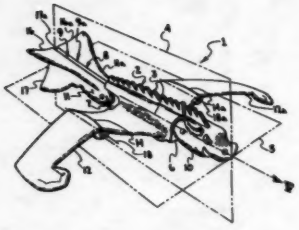
1. A toy glider in the form of an animal figure comprising:

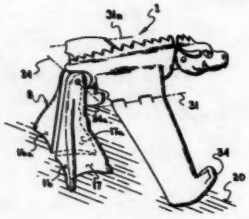
an elongated fuselage generally symmetrical about a vertical plane, having a longitudinal axis, generally parallel sides, a front end and a rear end, when said toy glider is in a normal horizontal flight orientation, the fuselage being generally in the form of an animal torso adapted for the mounting of a nose section, a tail section and a pair of wings;

a nose section generally in the form of an animal head and attached by a first hinge to the front end of the fuselage;

a tail section generally in the form of a pair of animal legs terminating in feet, said legs being generally parallel to the

longitudinal axis and attached by a second hinge to the rear end of the fuselage;





a pair of generally planar wings, disposed in a horizontal plane, having the form of animal wings and attached to the sides of the fuselage.

4,988,321

SURPRISE AND LEARN MOLDING TOY

Adolph E. Goldfarb, 1432 S. Eastwind Cir., Westlake Village, Calif. 91361

Filed Feb. 2, 1990, Ser. No. 474,526

Int. Cl.[5] A63H *33/00*

U.S. Cl. 446—075 **21 Claims**

1. A toy molding device comprising

means defining a cavity,

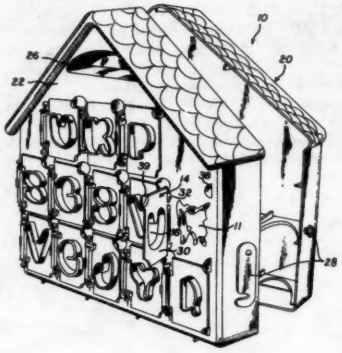
said cavity-defining means having a wall portion defining an entrance having a shape that represents a two-dimensional element visually identifiable by the child-user,

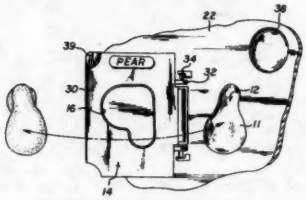
said entrance being proportioned to allow a body of moldable material to be inserted through said entrance to substantially occupy said cavity,

said cavity having a shape that represents a three-dimensional element visually identifiable by the child-user, said two and three-dimensional elements having a relationship to one another readily appreciated by the child-user,

said wall portion at least partially blocking the cavity from the view of the child-user,

said cavity-defining means being openable to provide full access to the cavity so as to allow an object formed in the





cavity in the shape of the three-dimensional element by the moldable material to be removed from the cavity.

4,988,322

TOY BUILDING SET FOR BUILDING TREE-LIKE MODELS

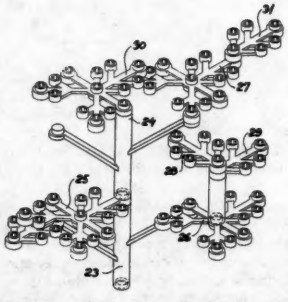
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland

Filed Nov. 25, 1987, Ser. No. 125,185

Claims priority, application Denmark, Nov. 26, 1986, 5680/86

Int. Cl.[5] A63H *33/06*

U.S. Cl. 446—120 **4 Claims**



1. A toy building set for building tree-like models and including elements having primary and secondary coupling means adapted for interconnection, characterized by comprising in combination

a plurality of elongate trunk elements, each of which has at least a primary and secondary coupling means, respectively, in its opposed ends, at least some of said trunk elements having elongate branching portions formed with

coupling means of the aforementioned type at the ends thereof, and

a plurality of substantially plane branch elements, each comprising a number of integral branch bars, at least some of which have primary and secondary coupling means which are adapted to be connected with the coupling means on the trunk elements wherein the primary coupling means and the secondary coupling means of a branch element extend from a primary side and a secondary side of the plane branch element, respectively.

4,988,323

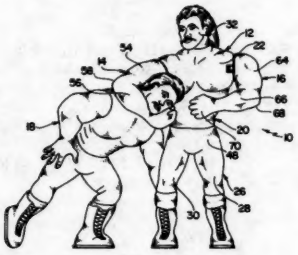
WRESTLER CHARACTER FIGURE

Daniel W. Price, Chepachet, R.I., assignor to Hasbro, Inc., Pawtucket, R.I.

Filed Feb. 6, 1990, Ser. No. 475,847

Int. Cl.[5] A63H *13/06*

U.S. Cl. 446—334 **1 Claim**



1. A wrestler character figure comprising:

(a) a free standing main body member including a pair of leg portions, a torso portion supported on said leg portions, said torso portion including first and second shoulders and a waist, and a head and neck portion supported on said torso portion above said shoulders;

(b) first arm portion means pivotally attached to said torso portion adjacent said first shoulder, said first arm portion means being positionable in a headlock hold position, wherein said first arm portion means extends outwardly and downwardly from said torso portion and then back inwardly and further downwardly toward said torso portion for securing an opponent character figure in a headlock position with the head of said opponent character figure located at least partially in the front of said torso portion; and

(c) second arm portion means on said torso portion, said second arm portion means including substantially straight upper and lower second arm sections, an elbow section joining said upper and lower second arm sections and a hand section on said lower second arm section, said second arm portion means further including pivot means pivotally joining said upper second arm section to said torso portion adjacent said second shoulder so that said upper second arm section extends downwardly therefrom to said elbow section, said elbow section being located at an elevation which is approximately midway between the elevation of said second shoulder and the elevation of said waist, said lower second arm section normally extending angularly forwardly and across the front of said torso portion from said elbow section in a substantially horizontal disposition toward the head of said opponent character figure when said opponent character figure is secured in the headlock position, said pivot means pivotally joining said upper second arm section to said torso portion so that said second arm portion is pivotable about a substantially vertical axis in said torso portion, and means biasing said second arm portion so that said hand section is biased toward the head of said opponent character figure when said opponent character figure is secured in the headlock position.

4,988,324

TOY FIGURE WITH BALL AND SOCKET JOINT

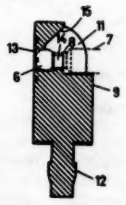
Jan Ryaa, Billund, and Ole Poulsen, Vejle, both of Denmark, assignors to Interlego A.G., Baar, Switzerland

Continuation of Ser. No. 84,792, Jul. 16, 1987, abandoned. This application Sep. 26, 1989, Ser. No. 414,613

Claims priority, application Denmark, Dec. 4, 1985, 5608/85

Int. Cl.[5] A63H *3/46, 3/16;* **F16C** *11/06*

U.S. Cl. 446—383 **4 Claims**



1. In a toy figure having movable body parts including a joint between two mutually movably connected body parts, said joint comprising a ball at an end of a pin protruding from one body part and a depression including a socket to receive said ball on the other body part, the improvement wherein said pin further includes a rod spaced apart from said ball and disposed between said one body part and said ball, the outer surface of said rod defining an engagement face, and said depression further includes a pair of opposed walls spaced apart a distance slightly less than the cross sectional dimension of said rod so that the engagement face is squeezed between the walls when the body parts are interconnected.

4,988,325

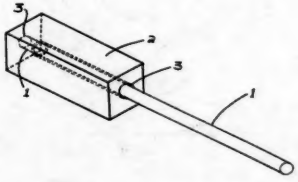
TURKEY CALL

Franklin R. Alderson, 931 Mounts Rd.; Dennis E. Sherman, 955 Fayette St., and Hayes Harvey, R. D. #8, all of Washington, Pa. 15301

Filed Jan. 13, 1989, Ser. No. 296,672

Int. Cl.[5] A63H *5/00*

U.S. Cl. 446—397 **5 Claims**



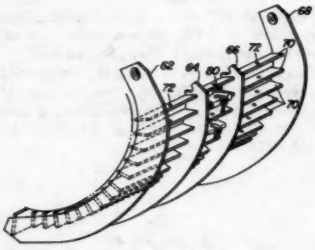
1. A turkey call comprising a striking rod and a striking surface, said striking rod being made of hardwood and said striking surface being of a hard synthetic polishing stone, made of grit having a fineness of at least 500 particles to the inch.

4,988,326

CONCAVE GRID INSERTS

Robert E. Bennett, Moline, Ill., assignor to Deere & Company, Moline, Ill.

Filed Mar. 15, 1990, Ser. No. 494,643
Int. Cl.[5] A01F *12/26, 12/28*
U.S. Cl. 460—110 10 Claims



6. A concave for an agricultural threshing machine, the concave comprising:

curved longitudinal bars;

transverse cross bars joining the curved longitudinal bars, at least one of the cross bars is provided with a grid insert mounting aperture located between adjacent longitudinal bars for mounting a grid insert to the concave; and

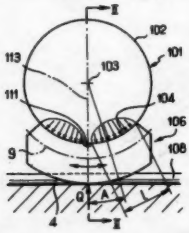
a grid insert for a concave of an agricultural threshing machine, the grid insert having a frame defining a slot by first and second sidwalls, the first sidewall is provided with a first engagement aperture and the second sidewall is provided with a second engagement aperture that is coaxial with the first engagement aperture, the frame is also provided with grid insert segments and a mounting assembly and a mounting pin slidably mounted to the mounting assembly and being located so as to extend selectively into both of the coaxial first and second engagement apertures and the grid insert mounting aperture in the concave cross bar.

4,988,327

DEVICE FOR TRANSFERRING LOAD THROUGH A ROLLING ELEMENT MOUNTED WITH A PLAIN BEARING, METHODS FOR PRODUCING THE DEVICE, AND A TRANSMISSION JOINT PROVIDED WITH THE LATTER

Michel A. Orain, Conflans-Ste-Honorine, France, assignor to Glaenzer-Spicer, Poissy, France

Filed Oct. 7, 1988, Ser. No. 254,691
Claims priority, application France, Oct. 9, 1987, 87 13976
Int. Cl.[5] F16D *3/205*
U.S. Cl. 464—111 9 Claims



1. A load transmission device, comprising:

means defining a track;

a trunnion having a peripheral wall; and

a rolling element having an inner peripheral wall in rotatively mounted contact with said peripheral wall of said trunnion about an axis of rotation, and an outer wall for rolling on said track to transfer a load between said track and said trunnion;

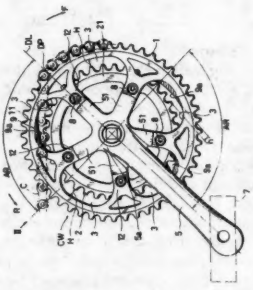
wherein said trunnion and said rolling element in a first state have no load on said rolling element from said trunnion and in a second state have a load on said rolling element from said trunnion, one of said rolling element and said trunnion in said second state being deformed by bending moment and shear forces due to said load such that said inner peripheral wall of said rolling element substantially conforms to said peripheral wall of said trunnion, and one of said rolling element and said trunnion in said first state being undeformed and separated from the other of said rolling element and said trunnion along said inner peripheral wall of said rolling element and said peripheral wall of said trunnion a distance defined by an amount of compensation corresponding to the sum of the effects of said bending moment and said shear force due to said load on said one of said rolling element and said trunnion.

4,988,328

BICYCLE MULTIPLE CHAINWHEEL

Yoshihisa Iwasaki, and Jun Kobayashi, both of Sakai, Japan, assignors to Maeda Industries, Ltd., Osaka, Japan

Filed Mar. 5, 1990, Ser. No. 488,121
Claims priority, application Japan, Mar. 6, 1989, 1-25407[U]; Mar. 6, 1989, 1-25408[U]
Int. Cl.[5] F16H *55/30*
U.S. Cl. 474—160 11 Claims



1. A bicycle multiple chainwheel which is drivingly rotated by a pair of pedalling crank arms, said chainwheel comprising a larger sprocket and at least one smaller sprocket coaxial with said larger sprocket, wherein:

said larger sprocket has a tooth carrying ring, said larger sprocket further having a plurality of weight reduction openings arranged at substantially equal angular spacing and partially defined by said tooth carrying ring; and

said tooth carrying ring is radially wider at selected ones of said weight reduction openings than at the other weight reduction openings.

4,988,329

FINAL DRIVE ASSEMBLY

Bryan G. Lammers, Washington, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Mar. 23, 1990, Ser. No. 498,130
Int. Cl.[5] F16H *3/44*
U.S. Cl. 475—337 10 Claims

1. A final drive assembly for transferring power from a relatively high speed power input shaft to a relatively low speed sprocket wheel, comprising:

a stationary housing having an internal ring gear portion;

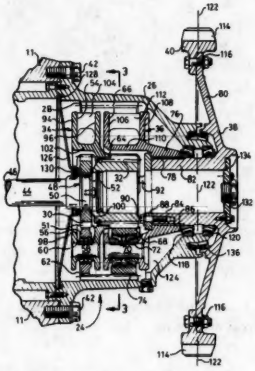
a first sun gear rotatably connected to said power input shaft;

a second sun gear;

a first planet assembly, including a first planet carrier and a plurality of first planet gears, said first planet gears being rotatably supported within said first planet carrier;

a second planet assembly, including a second planet carrier and a plurality of second planet gears, said second planet gears being rotatably supported within said second planet carrier, said second planet assembly rotatably connected to said first planet assembly through said second sun gear;

a sprocket support member having a hub portion and a tubular portion, said tubular portion having an external



surface, said second planet carrier being rotatably connected to said tubular portion;

a sprocket wheel having a plurality of teeth and being releasably secured to said support member hub portion;

a plurality of bearing assemblies positioned on the external surface of said tubular portion and rotatably supporting said support member tubular portion within said housing;

said power input shaft, said first and second planet assemblies, and said support member tubular portion being substantially co-axial; and

said first and second planet assemblies being positioned laterally inwardly of said sprocket support member.

4,988,330

MACHINE FOR AND METHOD OF MANUFACTURING FOLDED CONTAINERS

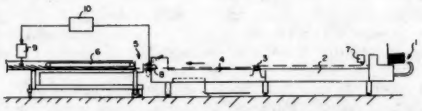
Wolfgang Bensberg, Düsseldorf, Fed. Rep. of Germany, assignor to Jagenberg Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 288,510

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743728

Int. Cl.[5] B31B *3/62, 5/64, 3/36*

U.S. Cl. 493—16 **2 Claims**



1. In a method of manufacturing a stream of folded containers in an apparatus including a marking or rejecting station to mark blanks for rejection or to reject blanks in response to the calculated length, the method comprising applying adhesive to a continuous stream of spaced container blanks, folding the blanks, overlapping the blanks in the stream, applying pressure to form the blanks into containers, passing the blanks through the marking or rejecting station, and interrupting the method from time to time, the improvement which comprises after each interruption determining the number of containers to which adhesive has been applied but to which pressure has not yet been applied before such interruption, calculating the length of the associated stream of overlapping blanks therefrom, and, subsequent to a delay that corresponds to the time it takes to transport the blanks from the point at which they enter the pressure-application location and the point at which blank enters the marking or rejecting station, activating the marking or rejecting mechanisms for a period that corresponds to the time it takes to convey a stream of overlapping blanks of the calculated length.

2. In a method of manufacturing a stream of folded containers in an apparatus including a marking or rejecting station to mark blanks for rejection or to reject blanks in response to the calculated length, the method comprising applying adhesive to a continuous stream of spaced container blanks, folding the blanks, overlapping the blanks in the stream, applying pressure to form the blanks into containers, passing the blanks through the marking or rejecting station, and interrupting the method from time to time, the improvement which comprises after each interruption determining the number of containers to which adhesive has been applied but to which pressure has not yet been applied before such interruption, calculating the length of the associated stream of overlapping blanks therefrom, and, subsequent to a delay that corresponds to the distance between the point at which a blank enters the pressure-application location and the point at which blank enters the marking or rejecting station, activating the marking or rejecting mechanisms for a period that corresponds to the time it takes to convey a stream of overlapping blanks of the calculated length.

4,988,331

PROGRAMMABLE DYNAMICALLY ADJUSTABLE PLUNGER AND TRAY FORMER APPARATUS AND METHOD OF ADJUSTING

Jean-Louis Boisseau, Courgerennes, France, assignor to Vega Automation, France

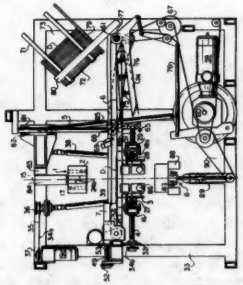
PCT No. PCT/FR88/00132, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/06519, PCT Pub. Date Sep. 7, 1988

PCT Filed Mar. 7, 1988, Ser. No. 274,054

Claims priority, application France, Mar. 6, 1987, 87 03087

Int. Cl.[5] B31B *3/46, 1/44*

U.S. Cl. 493—171 **3 Claims**



1. A method for dimensionally adjusting a die-stamping assembly for forming cardboard packaging tray blanks,

said blanks having a fixed thickness,

said assembly including a first die-stamping member and a second die-stamping member, each member including separate adjustable and lockable parts, said first die-stamping member being generally fixed and said second die-stamping member being axially slidably movable toward said first member,

said method including the following steps:

(a) moving said second die-stamping member into contact with said first die-stamping member;

(b) retracting said parts of said first die-stamping member and said second die-stamping member to minimum reference point;

(c) moving said parts of said second die-stamping member and simultaneously moving corresponding parts of said first die-stamping member until said first die-stamping member assumes a desired dimension;

(d) moving said parts of said first die-stamping member away from said second die-stamping member until said first die-stamping member is separated from said second die-stamping member by a space equal to said thickness; and

(e) locking said parts of both said first and second die-stamping members;

(f) moving said second die-stamping member away from said first die-stamping member.

4,988,332

METHOD FOR PRODUCING PACKING BAGS WHICH CAN BE STACKED ON A WICKET

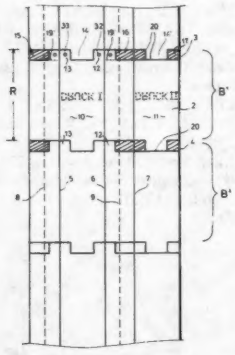
Helmut Mattle, Gronau, Fed. Rep. of Germany, assignor to M u. W Verpackungen Mildenberger u. Willing GmbH & Co. KG, Gronau, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,525

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1988, 3834568

Int. Cl.[5] B31B *1/16, 1/86*

U.S. Cl. 493—196 7 Claims



1. A method for producing packing bags which are stackable on a wicket and unfoldable during a filling operation and for that purpose are provided with exposed wicket perforations disposed in a wicket tab, the bags being made from an outspread web having opposed outer edges, said web being first folded to an open-sided tube then made into a flat-folded tube, and bonded; said method comprising the steps of severing the outspread web at the regularly spaced intervals that separate the web into bag lengths having a bottom area and a top area means of cuts made transversely of the cuter edges of the web to form a castellated outline, the bottom area and top area of two successive bag lengths lying adjacent one another and resulting in interfitted tabs and notches, the tabs in the top area forming handle tabs; folding each bag length so that said handle tabs are superimposed; bonding the outer edges and the top area of each bag length to form an open ended tube; punching at least one tab in the bottom area with a hole to form a wicket tab; and removing unneeded additional web material between the tabs.

4,988,333

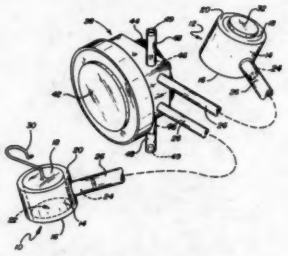
IMPLANTABLE MIDDLE EAR HEARING AID SYSTEM AND ACOUSTIC COUPLER THEREFOR

A. Maynard Engebretson, Ladue, and John Fredrickson, Clayton, both of Mo., assignors to Storz Instrument Company, St. Louis, Mo.

Filed Sep. 9, 1988, Ser. No. 242,365

Int. Cl.[5] H04R *25/00*

U.S. Cl. 600—25 35 Claims



32. An acoustic means for sound pick-up or sound delivery for use in an implantable hearing aid for the middle ear, said acoustic means comprising a chamber, a diaphragm connected to said chamber, acoustic tube means connected to said acoustic means, and attachment means on said diaphragm for connection to an ossicular bone in the middle ear.

4,988,334

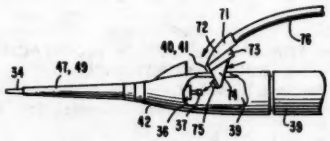
ULTRASONIC SURGICAL SYSTEM WITH ASPIRATION TUBULATION CONNECTOR

Robert W. Hornlein, Stamford; Joseph N. Logan, Trumbull, both of Conn.; Alan Broadwin, Brooklyn, N.Y., and Vaclav O. Podany, New Fairfield, Conn., assignors to Valleylab, Inc., Boulder, Colo.

Division of Ser. No. 849,830, May 9, 1988, Pat. No. 4,747,820. This application May 26, 1988, Ser. No. 199,141

Int. Cl.[5] A61B *17/32*

U.S. Cl. 604—22 12 Claims



1. In combination with an assembly of an ultrasonically vibratable tip having an exposed aspiration port adjacent a proximal end thereof and communicating with an aspiration passage formed therein, said tip being connected at the proximal end to a source of ultrasonic vibrations in a handpiece in an ultrasonic surgical aspiration system so that at least a portion of said tip is enveloped by a nosecone which is connected to said handpiece and has a slot in register with a slot in said vibration source, said slots when in register permitting access to said exposed port of said tip when assembled to an exterior of said assembly, the improvement comprising:

a removable aspiration tubulation connector having an inlet port structurally adapted for connection to the aspiration port of said tip and an outlet port structurally adapted for connection to aspiration tubing at the exterior of said nosecone;

said removable aspiration tubulation connector being structurally adapted to define an aspiration fluid passage through said slots in register from said inward port to said outward port;

said removable aspiration tubulation connector having a

transition part structurally adapted to removably fit within said nosecone slot in a secure relationship when said inlet port is secured to said aspiration port said aspiration tubulation connector having a body portion sized and shaped to have a releasably secure engagement with said nosecone slot, and

said outlet port lying along an axis exterior to said handpiece, said axis being axially offset relative to the axis of said aspiration port of said tip and said inlet port on said connector.

4,988,335

PELLET IMPLANTER APPARATUS

Gordon E. Prindle, Schaumburg, and Thomas J. Kelm, Forest Park, both of Ill., assignors to Ideal Instruments, Inc., Chicago, Ill.

Filed Aug. 16, 1988, Ser. No. 232,693
Int. Cl.[5] A61M *31/00*
U.S. Cl. 604—61 6 Claims

1. A hand held gun apparatus for implanting a pellet into an animal which comprises:

(a) a hollow needle defining a barrel for implanting the pellet into the animal;

(b) a head means on the gun apparatus supporting the needle with an opening through the head means into the barrel;

(c) a carrier for a pellet mounted at the opening for holding the pellet in the opening so that the pellet can pass through the barrel;

(d) a pistol grip means supporting the head means;

(e) a drive rod linearly moveable through an opening between the ends of the head means and into the barrel from the pistol grip;

(f) an actuating means mounted in the pistol grip for moving the drive rod into and out of the barrel; and

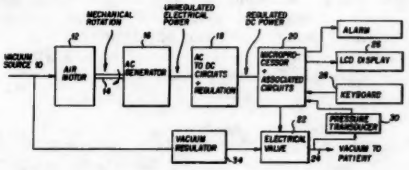
(g) trigger means mounted on the pistol grip and having opposed sides which slide into the pistol grip and actuatable by the fingers for moving the actuating means and thus drive rod into and out of the barrel, wherein the actuating means is a pivotable linkage means mounted on a pivot means on the pistol grip adjacent the trigger means and between linearly movable holder means for the drive rod and an inside portion of the trigger means, wherein there are arcuate openings on the opposed sides of the trigger means which are movable over the pivot means when the trigger means is moved into the pistol grip, wherein a spring means is mounted between the pistol grip and linkage means to return the linkage means and the trigger means to a rest position after the trigger means is released from being moved into the pistol grip, wherein the linkage means, holder means and drive rod are moved by movement of a surface of the linkage means on a roller bearing mounted on the inside portion of the trigger means and wherein the linearly movable holder means for the rod is mounted in a slot in the pistol grip and the holder means with the rod is moved by the linkage means in the slot and wherein the linkage means passes through and out of an opening in the holder means and pushes the holder means as the trigger means is actuated to move the holder means and rod so that the rod is moved into the barrel of the needle.

4,988,336

ELECTRONIC SUCTION REGULATOR

Gabriel S. Kohn, Ballwin, Mo., assignor to Allied Healthcare Products, Inc., St. Louis, Mo.

Filed Sep. 22, 1989, Ser. No. 410,862
Int. Cl.[5] A61M *5/30*
U.S. Cl. 604—67 22 Claims



1. An electronically controlled suction regulator, comprising:

a source of vacuum;

a vacuum regulator connected to said source of vacuum;

a generator connected to be driven by said source of vacuum such that said generator produces an electrical current;

an electrically operated valve connected to said vacuum regulator; and

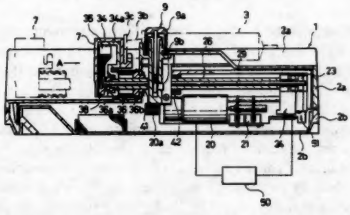
electronic circuitry powered by said electrical current for generating control signals for controlling said electrically operated valve so that said source of vacuum is supplied to a patient for predetermined periods of time.

4,988,337

SYRINGE PUMP APPARATUS

Yoshio Ito, Fujinomiya, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 391,192
Claims priority, application Japan, Aug. 10, 1988, 63-199682
Int. Cl.[5] A61M *5/20*
U.S. Cl. 604—154 8 Claims



1. A syringe pump apparatus adapted to supply a specified amount of aqueous solution per unit of time from a syringe within which the aqueous solution is accommodated, comprising:

a main body of the syringe pump apparatus;

syringe holding means provided on said main body for having said syringe placed thereon;

a slider for engaging a piston portion of said syringe when said syringe is placed on said main body of the pump apparatus, said slider being slidably mounted on said main body so as to move said piston portion;

first shaft means;

fixing means for fixing said first shaft means for enabling said first shaft means to move as one with said slider;

a drive source for supplying a drive force for causing sliding movement of said slider;

connecting means for disconnectably connecting said drive

source and said slider, said connecting means including second shaft means coupled to said slider and a block coupled to said second shaft means;

overload detecting means provided on said block, said overload detecting means being coupled to said first shaft means and including means for detecting a state of overload of said slider in accordance with a load produced in said first shaft means due to a forced stop of said slider, said load being produced when sliding movement of said slider is forcedly stopped during a time period in which said slider is being driven by said drive source; and

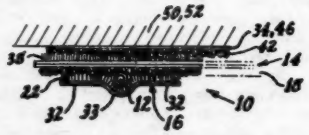
drive halting means including means coupled to said drive source and being responsive to said overload detecting means for causing the driving of said drive source to be halted in accordance with a result of the detection made by said overload detecting means.

4,988,338

IDENTIFICATION ACCESSORY DEVICE

Kermit K. Taylor, 5354 Roxbury Rd., Indianapolis, Ind. 46226, and Kermit L. Taylor, 16182 Rapids Rd., Burton, Ohio 44021

Filed Nov. 4, 1988, Ser. No. 267,368
Int. Cl.[5] A61M *25/02*
U.S. Cl. 604—180 **7 Claims**



1. An identification accessory device providing for pluralistic labelling of an associated set of slender work objects which are operatively accommodative of shifting of their locations so as to be positionable in spaced although adjacent relation to one another, the device comprising:

a body member;

the body member having an outer surface on which is carried a first type Velcro-nature fastener means;

a set of identification bodies each having a rear surface, and provided with a second-type Velcro-nature fastener means on their rear surface, and carrying an identification indicia;

the identification bodies being respectively engageable with both the associated work objects and with the body member's outer surface, with the identification indicia showing outwardly, and supportively holding the associated work objects to the body member;

the fastener means on the outer surface of the body member, and on the rear surface of each identification body, both extending over the location of the axis of the work object, permitting freedom of movement of the work object in a direction longitudinal of itself, but extending so close to the object axis as to substantially prevent movement transverse to said axis even though not having any adhesion contact with the object;

the arrangement providing that each of the associated work objects will be both labelled by respective identification bodies, and the work objects will be held in adjacently spaced relation against the body member, with the identification bodies providing the double function of holding the work objects to the body member and providing identification of the respective work objects, and the body member providing the double function of retaining the identification bodies and providing a support for the supported arrangement of the work objects in an adjacently spaced manner;

in which the body member has a rear surface which is provided with a first type Velcro-nature surface means,

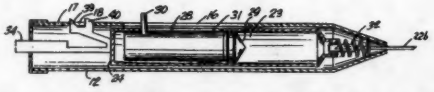
a support strap being provided having on one side a second type Velcro-nature surface means and on the other side of an adhesive means.

4,988,339

RETRACTABLE NEEDLE/SYRINGE DEVICES FOR BLOOD COLLECTION, CATHETERIZATION, AND MEDICINAL INJECTION PROCEDURES

Dinesh L. Vadher, 278 E. Main St., Smithtown, N.Y. 11787

Filed Dec. 30, 1988, Ser. No. 292,493
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—197 **21 Claims**



1. A retractable hypodermic needle/syringe device adapted for use in fluid collection and dispensing procedures, comprising:

an elongated, substantially tubular housing, said housing having a first end portion and an opposite second end portion, said second end portion having an opening therethrough;

a barrel member disposed within said housing and being formed with a front end portion adjacent said second end portion of said housing and a closed back end portion, said barrel member slidably translatable within said housing forwardly from a first position to a second position and back again;

a hollow hypodermic needle disposed adjacent said second end portion of said housing in fixed engagement with said front end portion of said barrel member, said needle formed with a first open end extending into said barrel member and a second open end axially aligned with said opening in said second end portion of said housing, said second open end of said needle passing through said opening and projecting out of said housing upon forward translation of said barrel member to said second position;

translation means for forwardly translating said barrel member within said housing from said first position to said second position;

locking means cooperating with said translation means for automatically releasably locking said barrel member in said second position and thereby maintaining said second open end of said needle in a projected state without assistance from the user of said device;

drawing and dispensing means slidably received within said barrel member, said drawing and dispensing means adapted to draw fluid into and dispense said fluid from said barrel member via said needle; and

resilient means disposed within said housing to bias said barrel member in said first position, said resilient means yieldingly urging said barrel member forwardly to said second position in response to operation of said translation means so as to project said second open end of said needle from said housing, said resilient means resiliently urging said barrel member back to said first position in response to the release of said locking means such that said second open end of said needle fully retracts into said housing.

4,988,340

TUBULAR DRAINAGE DEVICE

Christopher Kitchin, 5098 Rootstown Rd., Ravenna, Ohio 44266

Filed Apr. 26, 1989, Ser. No. 343,916
Int. Cl.[5] A61M *27/00*
U.S. Cl. 604—280 **8 Claims**

5. A one piece molded suturable dental drainage device comprising:

(a) an elongated resilient cylindrical tube open at both ends and having a longitudinal axis, and

(b) a resilient flange for suturing the device to the gum of a patient, said flange being integrally formed with said tube, said flange being located near but not precisely at one end of said tube so that a small portion of said tube extends beyond said flange, wherein the length of said small portion of said tube is in the range of about 0.2 to about 1 times the outside diameter of said tube,

said flange having a plurality of spaced suture holes,

said device being made of a biocompatible elastomeric material which is flexible and resilient.

4,988,341

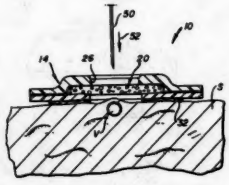
STERILIZING DRESSING DEVICE AND METHOD FOR SKIN PUNCTURE

Richard L. Columbus, and Thomas R. Kissel, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 5, 1989, Ser. No. 361,473

Int. Cl.[5] A61F *13/00*

U.S. Cl. 604—306 **4 Claims**



1. A sterilizing device for use with a needle to inject into or remove a liquid from a site on a live host body, said device comprising:

a transparent, puncturable, resealable gel medium containing a sterilizing agent preincorporated therein, said medium being constructed to :over said site;

a non-absorbent protective cover on one side of said medium having margin portions extending beyond the outside margin of said medium;

means for retaining said medium to said cover;

and adhesive disposed on surface portions of said extending portions of said cover, said adhesive being disposed for exposure and contact of said host body when said medium is exposed and in contact with said host body.

4,988,342

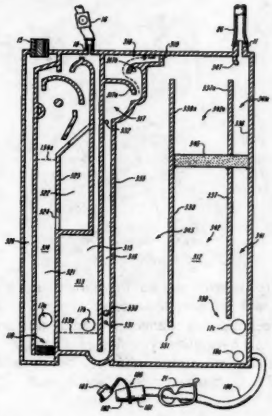
IMPROVED FLUID RECOVERY SYSTEM

Steve A. Herweck, Nashua, and Theodore Karwoski, Hollis, both of N.H., assignors to Atrium Medical Corporation, Hollis, N.H.

Continuation-in-part of Ser. No. 20,449, Mar. 2, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 255,764

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—321 **26 Claims**



1. A drain device for draining blood and fluids from the thoracic cavity of a patient, such device comprising a multichamber vessel of a total volume comparable to the pleural volume of a patient, said device including a manometer for establishing a predetermined suction level, and wherein the multichamber vessel includes

(i) a collection chamber having an inlet port for connection to the patient, an outlet, and a pooling region, and

(ii) a water seal U-column having an inlet port connected to said collection chamber outlet, and an outlet at the manometer to normally sustain is predetermined suctional draw in said collection chamber toward said manometer, and wherein said water seal inlet port is spaced from said water seal column along a path extending within said multichamber vessel and including a plurality of baffles spaced along a vertical path over said water seal column for reversing the direction of water rising in said column, and has a dimension sufficiently small to modulate abrupt pressure variations in said collection chamber caused by patient spasms, thereby effectively preventing back flow from said water seal to said collection chamber, whereby blood collected in said collection chamber is suitable for reinfusion in the patient.

4,988,343

DRAINABLE POUCH FOR COLLECTING EXCRETIONS FROM THE HUMAN BODY

Akeel Ballan, Copenhagen, Denmark, assignor to Coloplast A/S, Denmark

Filed May 15, 1987, Ser. No. 51,249

Claims priority, application Denmark, Jan. 30, 1985, 406/85

Continuation-in-part of Ser. No. 820,093, Jan. 21, 1986, abandoned.

Int. Cl.[5] A61F *5/44*

U.S. Cl. 604—332 **5 Claims**

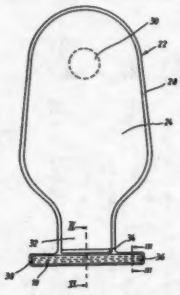
1. A device for collecting excretions from the human body, comprising:

a drainable pouch, containing at least two walls of a smooth flexible sheet material sealed to each other along a seam disposed along the perimeter of said sealed walls, defining an inner and outer surface of said pouch,

an inlet aperture in one of said walls,

a discharge aperture between said pouch walls, being formed by an interruption of the seam joining the two pouch walls,

a substantially inelastic, shape-retaining clip containing internally disposed reinforcing members, said clip being positioned parallel to said discharge aperture and in close



proximity thereto, and having ends extending outwardly beyond said discharge aperture,

flexible sheet material connected to said outer surface of said pouch, and hermetically sealed in a manner to surround and enclose said clip completely between said material and said outer surface of said pouch wall.

4,988,344

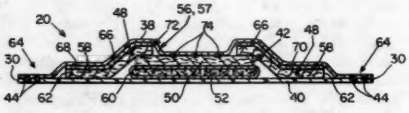
ABSORBENT ARTICLES WITH MULTIPLE LAYER ABSORBENT LAYERS

George S. Reising, Batavia; Bruce H. Bergman, Mason; Sandra H. Clear, Deerfield Township, Hamilton County; Susan E. Guinn, Colerain Township, Hamilton County, and Rolando Gomez-Santiago, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 24, 1988, Ser. No. 198,032

Int. Cl.[5] A61F *13/15*

U.S. Cl. 604—368 **42 Claims**



1. A disposable absorbent article comprising:

a liquid pervious topsheet;

a liquid impervious backsheet joined with said topsheet; and

an absorbent core positioned between said backsheet and said topsheet, said absorbent core comprising:

a first layer comprising hydrophilic fibrous material, a holding zone, and an acquisition zone having a lower average density than said holding zone, said holding zone at least partially laterally surrounding the perimeter of said acquisition zone so as to be in liquid communication with at least a portion of the lateral area of said acquisition zone, said first layer being positioned between said topsheet and said backsheet;

a liquid handling layer positioned between said first layer and said backsheet and being subjacent at least said acquisition zone of said first layer, said liquid handling layer comprising a resilient material having gush handling capacity to receive quantities of body exudates, said liquid handling layer being moisture insensitive and having a percentage void volume greater than about 80%; and

(c) a storage layer position between said backsheet and said liquid handling layer, said storage layer comprising a combination of fibrous material and discrete particles of absorbent gelling material.

4,988,345

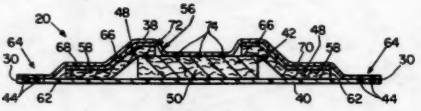
ABSORBENT ARTICLES WITH RAPID ACQUIRING ABSORBENT CORES

George S. Reising, Batavia, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 24, 1988, Ser. No. 198,036

Int. Cl.[5] A61F *13/16*

U.S. Cl. 604—368 **25 Claims**



1. A disposable absorbent article comprising:

a liquid pervious topsheet;

a liquid impervious backsheet joined with said topsheet; and

an absorbent core positioned between said backsheet and said topsheet, said absorbent core comprising:

a storage layer comprising a web of hydrophilic fibrous material and discrete particles of absorbent gelling material, and having an acquisition aperture; and

a liquid handling layer positioned subjacent at least said acquisition aperture of said storage layer so that said liquid handling layer is positioned between said storage layer and said backsheet of said absorbent article, said liquid handling layer comprising a resilient material having gush handling capacity to receive quantities of body exudates, said liquid handling layer being moisture insensitive and having a percentage void volume greater than about 80%.

4,988,346

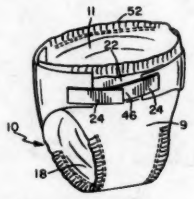
REAR FASTENING DISPOSABLE DIAPER

Jason L. Pfefferkorn, 1529 Woodpine Dr., El Cajon, Calif. 92019, assignor to Jason L. Pfefferkorn; Ronnie D. Swaim and James H. Evans, all of El Cajon, Calif.

Filed Jun. 5, 1989, Ser. No. 361,387

Int. Cl.[5] A61F *13/15*

U.S. Cl. 604—389 **7 Claims**



1. A disposable diaper, comprising:

a multi-layer, generally rectangular body member having a fluid impermeable outer layer, a fluid permeable inner layer, and an absorbent batt sandwiched between said outer and inner layer;

the body member having opposite end portions and a crotch portion of reduced width extending between said end portions, said end portions comprising the front and rear portions of the diaper when in use;

each end portion having a central area aligned with said crotch portion and outwardly projecting opposite corner portions;

first securing means projecting from the outer edge of only one of the corner portions of said rear end portion for

securing said corner portion to the front end portion to hold the diaper on a wearer; and

second securing means projecting from the outer edge of each of the corner portions of said front end portion for securing said corner portions to the central area of said rear portion at a location behind the wearer's back, said first and second securing means at least at said one side being offset and at least one of said front and rear corner portions at said one side having a cut-out adjacent its respective securing means for allowing said first and second securing means to be overlapped and separately secured to the opposite end portions of the diaper.

4,988,347

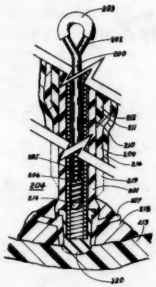
METHOD AND APPARATUS FOR SEPARATING A COILED STRUCTURE FROM BIOLOGICAL TISSUE

Louis Goode, Evans City, and Frederick J. Shipko, Spring Church, both of Pa., assignors to Cook Pacemaker Corporation, Leechburg, Pa.

Filed Nov. 9, 1988, Ser. No. 269,771

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—1 **24 Claims**



1. Apparatus for separating a length of a coiled structure having a longitudinal passageway therein from biological tissue, comprising:

wire means having a distal end for inserting in said longitudinal passageway of said coiled structure;

coil means attached about said distal end of said wire means for radially expanding and securing said wire means to said coiled structure; and

tube means positionable about said wire means and said length of said coiled structure for separating said coiled structure from said biological tissue when said wire means is secured to said coiled structure.

4,988,348

METHOD FOR RESHAPING THE CORNEA

Josef F. Bille, Rancho Santa Fe, Calif., assignor to Intelligent Surgical Lasers, Inc., San Diego, Calif.

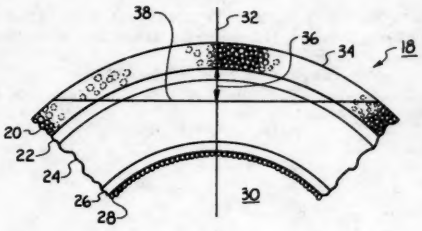
Filed May 26, 1989, Ser. No. 357,705

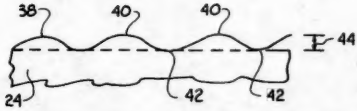
Int. Cl.[5] A61N *5/06*

U.S. Cl. 606—5 **25 Claims**

1. A method for controlled reshaping of the cornea of the eye which comprises the steps of:

removing a specified volume of corneal tissue by photoablation using laser pulses having plasma forming energy densities to establish a predetermined corrected surface; and





smoothing said corrected surface by photoablation using laser pulses having energy densities substantially below an effective plasma forming level.

4,988,349

DEVICE FOR OSTEOSYNTHESIS

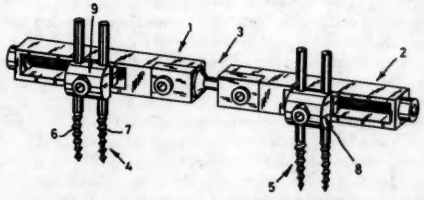
Dietmar Pennig, Münster, Fed. Rep. of Germany, assignor to Orthofix S.r.l., Blussolengo VR, Italy

Continuation of Ser. No. 273,818, Sep. 19, 1988, abandoned. This application Jul. 16, 1990, Ser. No. 552,345

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701533.8

Int. Cl.[5] A61B *17/60*

U.S. Cl. 606—58 **17 Claims**



1. A device for promoting the healing of bones, comprising first and second supports having confronting end portions; at least one anchoring member separably mounted on each of said supports and designed to be anchored in bone structure; a substantially barbell-shaped connector for joining the confronting end portions of said supports to one another, said connector including first and second at least approximately spherical elements each mountable on the end portion of the respective support, and a spacer rigidly connecting said elements to one another, said device being free of protrusions extending between said supports and the interiors of the respective elements, the end portion of each of said supports being provided with a first socket having the configuration of a quarter of a sphere; and means for arresting said connector relative to said supports, including first and second confining members distinct from and arranged to cooperate with the respective supports and including second part spherical sockets complementary to the respective first sockets, each of said elements being receivable in the respective first and the respec-

tive second socket to establish a universal joint between said spacer and the respective support.

4,988,350

DEVICE FOR RECONNECTING A BROKEN BONE

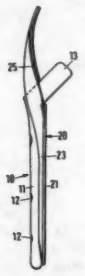
Wolfgang Herzberg, Holmer Strasse 165, D2000 Wedel, Fed. Rep. of Germany

Filed Jun. 23, 1989, Ser. No. 370,610

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 8808123

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—65 8 Claims



1. Device for connecting a fractured bone, such as the femoral neck area, comprising a bone fastening cover plate with fastening perforations, said cover plate having a longitudinal direction extending parallel to the longitudinal axis of a bone to which it is to be connected by fastening means a sleeve carried by and positioned at an angle relative to the bone fastening member and a trochanter supporting plate, wherein the trochanter supporting plate (**20**) is detachably connectable to the bone fastening cover plate (**11**) and comprises an elongated plate-shaped section (**29**) corresponding approximately to and elongated in the longitudinal direction of the bone fastening cover plate (**11**), said plate shaped section has a web (**24**), one end (**24***a*) of said web passes into a plate-shaped section (**25**) extending in the elongated direction and forming a trochanter supporting surface, the web (**24**) has two sides extending in the elongated direction with a reinforcing leg (**22, 23**) extending along each side for at least a partial length of the elongated web (**24**) and into a portion of the section (**25**), toward a terminal area (**25***a*) of the section spaced from the web, and in the direction toward the terminal area (**25***a*), runs out tapering conically, the bone fastening cover plate (**11**) of the device (**10**) is positionable between the two legs (**22, 23**) and is arranged to rest against the web (**24**) so that the section (**25**) forming the trochanter supporting surface projects in the elongated direction from the bone fastening cover plate (**11**) and an ovaloid perforation (**27**) for the passing through of the bone fastening member reception sleeve (**13**).

4,988,351

WASHER FOR USE WITH CANCELLOUS SCREW FOR ATTACHING SOFT TISSUE TO BONE

Leon E. Paulos; Thomas D. Rosenberg, both of Salt Lake City, Utah, and Randall D. Ross, Largo, Fla., assignors to Concept, Inc., Largo, Fla.

Filed Jan. 6, 1989, Ser. No. 293,973

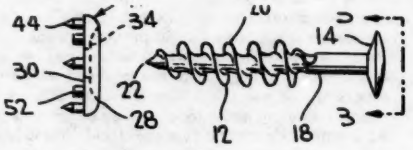
Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—72 28 Claims

1. A washer for engaging soft tissue in the body comprising a washer body having a proximal face and a distal face;

pin means extending from said distal face for penetrating soft tissue; and

stop means independent of said pin means, and laterally spaced from said pin means, said stop means extending



from said distal face a distance less than said pin means to limit penetration of said pin means in the soft tissue.

4,988,352

METHOD AND APPARATUS FOR FOLDING, FREEZING AND IMPLANTING INTRAOCULAR LENS

Brooks J. Poley, 2 Greenway Gables, Minneapolis, Minn. 55403

Continuation-in-part of Ser. No. 345,837, May 1, 1989, Pat. No. 4,917,690, and Ser. No. 213,325, Jun. 30, 1988, Pat. No. 4,911,714, which is a continuation-in-part of Ser. No. 31,250, Mar. 26, 1987, Pat. No. 4,769,034. This application Oct. 3, 1989, Ser. No. 416,361

Int. Cl.[5] A61B *17/00;* A61F *2/16*

U.S. Cl. 606—107 33 Claims

1. The method comprising,

folding an intraocular lens about a blade,

applying cooling to said blade to cool the lens folded about said blade, and

reducing the temperature of the blade sufficiently that the lens is rigidified in the folded configuration on the blade.

4,988,353

DEPILATORY DEVICE AND HAIR-PLUCKER BODY FOR USE THEREIN

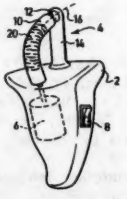
Joseph Gross, Moshav Mazor, Israel, assignor to Hair Remover Ltd., Tel-Aviv, Israel

Filed Oct. 30, 1989, Ser. No. 429,237

Claims priority, application Israel, Nov. 11, 1988, 88361; May 19, 1989, 90347

Int. Cl.[5] A61B *17/50*

U.S. Cl. 606—133 20 Claims



1. A depilatory device for removing body hair, comprising: a manually-grippable housing, and a hair-plucker body rotat-

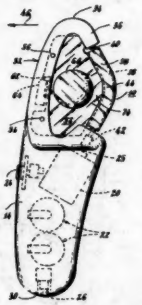
ably mounted to the housing and having an exposed section formed with a plurality of gaps in its outer surface which open and close during the rotation of the hair-plucker body to receive, pluck, and eject body hair growing on a surface over which the hair-plucker body is moved; said hair-plucker body being a flexible cylindrical member of plastic material having a smooth outer surface formed with a plurality of slits penetrating only partially through the plastic cylindrical member and extending circumferentially thereof; said plastic cylindrical member being rotated about its longitudinal axis and being supported in an arcuate position such that said slits open at the convex side of the plastic cylindrical member during its rotation to form said gaps which receive the hairs between the open confronting faces of the slits, and close at the concave side to clamp the hairs between the closed confronting faces of the slits; characterized in that said flexible cylindrical member includes a high-strength flexible core, of a material different from, and substantially stronger than, said plastic cylinder member, imparting mechanical strength to the member and thereby permitting its diameter to be reduced in order to catch short hairs, and/or permitting the slits to be formed deeper and/or more densely in order to catch more hairs.

4,988,354

DEPILATORY DEVICE

David R. Locke, Bridgeport, Conn., assignor to Remington Products, Inc., Bridgeport, Conn.

Filed Jan. 13, 1989, Ser. No. 297,189
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—133 **13 Claims**



6. An improved, hand-held, electrically energized depilatory device comprising:

(a) a housing for said device;

(b) said housing configured to be manually gripped for manipulation of said device;

(c) a hair gripping and removal body mounted to said housing for rotation thereof;

(d) electrically energized means positioned within said housing for causing rotation of said hair gripping body whereby said body when manipulated into contact with body hairs engages and uproots said body hairs; and,

(e) A guard member for said hair removal body; and,

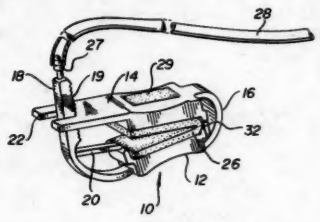
(f) means comprising an electrically energized lamp positioned on said device for illuminating a body site from which hair is to be gripped and removed by said hair gripping body, said hair removal body is mounted to said housing for advancement in a first direction for the engagement and removal and removal of body hairs and said lamp is positioned at a location preceding the hair removal body in the direction of motion for removal of body hairs.

4,988,355

ARTERIAL CLAMP

Eric G. Leveen, 19 Palmetto Rd., Charleston, S.C. 29407, and Robert F. Leveen, 312 Lombard St., Philadelphia, Pa. 19147

Filed Jan. 16, 1990, Ser. No. 464,546
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—158 **10 Claims**



1. A surgical clamp comprising a pair of arms, each arm being interconnected at one end to one end of the other arm by a flexible, resilient member normally urging said arms apart while maintaining facing surfaces, said resilient member permitting said arms to be moved toward each other until they are generally parallel, a clamping means of resilient material mounted in said arms, said resilient material being softer than the material of said clamping arms, and releasable ratchet means at the opposite end of one of said arms extending toward and being engageable with holding means on the other of said arms, so that when the arms are moved toward each other, the arms can be held in fixed relative positions, said ratchet means including a ratchet body, a flexible tubing mounted to said ratchet body and a guide member extending outwardly at an angle away from the ratchet body toward the clamping means to guide a blood vessel into the clamping means.

4,988,356

CATHETER AND GUIDEWIRE EXCHANGE SYSTEM

James F. Crittenden, Hollis, N.H.; Michael D. Barbere, Dunstable, and Bryan J. White, Lowell, both of Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Continuation of Ser. No. 19,644, Feb. 27, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 185,796
Int. Cl.[5] A61M *29/00*
U.S. Cl. 606—192 **27 Claims**

1. A catheter comprising:

an elongate flexible shaft having proximal and distal ends and at least one longitudinally extending lumen open at the distal end of the shaft;

a connector fitting mounted to the proximal end of the shaft;

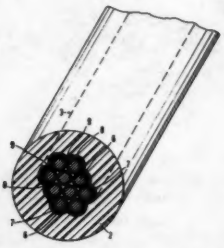
a single, linear longitudinally extending slit formed in the catheter shaft and extending from a location distal of but adjacent to said fitting along the catheter shaft and in communication with the lumen to enable transverse access to the lumen through the shaft, the slit extending along a major portion of the length of the catheter shaft.

4,988,357

PENIS PROSTHESIS

Walter Koss, Geisenheim, Fed. Rep. of Germany, assignor to Industriestrasse, Geisenheim, Fed. Rep. of Germany

Continuation of Ser. No. 836,230, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 673,440, Nov. 20, 1984, abandoned. This application Jun. 20, 1988, Ser. No. 211,075
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1983, 8335133
Int. Cl.[5] A61F 2/26
U.S. Cl. 623—11 15 Claims



1. A penis prosthesis in the form of an implantable flexible rod member including: a core portion comprising a plurality of metallic wires; a casing of elastic plastic material individually provided on at least a portion of the wires; and an outer casing comprising implantable plastic material enclosing the wires; wherein said casing individually provided on each of said wires comprises a smooth surface which permits sliding movement of said encased wires relative to one another.

4,988,358

METHOD FOR PROMOTING HARD TISSUE GROWTH AND REPAIR IN MAMMALS

Barry L. Eppley, 7702C Chaterly Ct., Indianapolis, Ind. 46214; Marilyn D. Krukowski, 24 Washington Terrace, St. Louis, Mo. 63112, and Philip A. Osdoby, 134 Holly Garden Dr., Ballwin, Mo. 63021

Filed Dec. 28, 1988, Ser. No. 291,175
Int. Cl.[5] A61F 2/28
U.S. Cl. 623—16 9 Claims

1. A method for promoting hard tissue growth and repair in sites of tissue defects in living mammals which comprises applying an effective quantity of material with a deliberately produced chemically induced effective surface charge to said sites, the tissue site being bone and the deficit being caused by at least one of trauma, non-union fracture, malignancy and malformation in said bone and said charge material being applied to said site and said material being an ion exchange material having a negative charge, said effective quantity being sufficient to promote said growth and repair.

4,988,359

FIXING STEM FOR AN ENDOPROSTHESIS

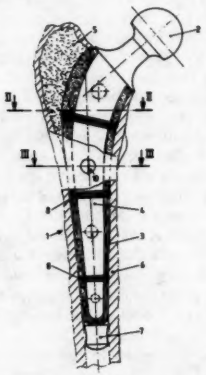
Otto Frey, Winterthur, and Koch: Rudolf, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Mar. 11, 1989, Ser. No. 392,776
Claims priority, application Canada, Aug. 23, 1988, 3128/88
Int. Cl.[5] A61F 2/32, 2/28
U.S. Cl. 623—23 10 Claims

1. In combination

a fixing stem for an endoprosthesis for fixing in a medullated bone; and

a plurality of peripherally closed spacers of wire mesh longitudinally spaced along and peripherally about said stem for spacing said stem from a medullated bone to define a plurality of peripheral spaces between said stem and the



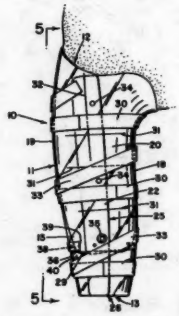
bone to individually receive a transversely delivered charge of bone cement therein.

4,988,360

ARTICLE AND METHOD FOR FITTING A PROSTHETIC, ISCHIAL CONTAINMENT SOCKET TO AN ABOVE-KNEE AMPUTEE

Daniel L. Shamp, Akron, Ohio, assignor to Prosthetic Consultants, Inc., Akron, Ohio

Division of Ser. No. 226,128, Jul. 29, 1988, Pat. No. 4,921,502. This application Jan. 16, 1990, Ser. No. 465,021
Int. Cl.[5] A61F 2/80, 2/76
U.S. Cl. 623—33 4 Claims



1. A method for fitting the interface portion of an ischial containment socket to the residual limb of an above-knee amputee comprising the steps of:

providing a hollow, transparent, thermoplastic, sleeve-like interface fitting module that has a peripheral discontinuity which extends between the proximal and the distal ends of the module;

inserting a residual limb through the proximal end of the module into the hollow interior thereof;

adjusting the peripheral dimension of the module to bring it into general conformity with the configuration of the residual limb received therein;

securing the adjusted peripheral dimension of the module;

marking those localized areas on the module which blanch the skin of, or gap away from, the residual limb received therein;

removing the residual limb from the module;

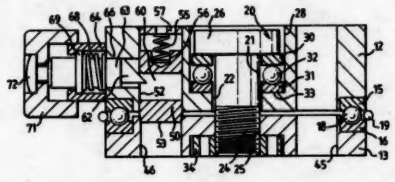
heating the marked, localized areas of the module;
modelling the heated areas of the module to bring them into the desired engagement with the residual limb; and,
repeating the previous three steps, as required.

4,988,361

TURNTABLE FOR ARTIFICIAL LIMB

John E. Cooper, Leatherhead, England, assignor to JE Hanger & Company Limited, United Kingdom

Filed Jul. 3, 1989, Ser. No. 374,976
Claims priority, application United Kingdom, Jul. 8, 1988, 8816311; Oct. 27, 1988, 8825194
Int. Cl.[5] A61F *2/62*
U.S. Cl. 623—38 **16 Claims**



1. A turntable for releasably interconnecting upper and lower parts of a limb prosthesis to permit the lower part to be rotated from a predetermined normal position, comprising first and second plates, movable means capable of movement at least partially in the axial direction for releasably locking the plates in their normal relative position, first rolling contact bearing means that fits between the plates adjacent their peripheries to permit relative rotation of the plates while maintaining the planes of adjacent faces of the plates parallel and a connector for connecting the plates against movement axially apart fastened to the first plate for rotation therewith and connected to the second plate by a second rolling contact bearing means.

4,988,362

COMPOSITION FOR COATING BIOCERAMICS, METHOD FOR COATING BIOCERAMICS THEREWITH, AND COMPOSITE BIOCERAMICS PRODUCED THEREWITH

Motohiro Toriyama, Kasugai, and Sukezo Kawamura, Inuyama, both of Japan, assignors to Agency of Industrial Science & Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,757
Claims priority, application Japan, Mar. 30, 1988, 63-77779
Int. Cl.[5] A61F *2/28;* **A61K** *1/02;* **C03C** *10/02;* **C09K** *3/00*
U.S. Cl. 623—66 **6 Claims**

1. A method for fusion of a bioceramic to the surface of a bioceramic inert to vital tissues, comprising:

(A) coating the surface of said bioceramic inert to vital tissues with a bioceramic composition consisting essentially of a composition produced by mixing alumina and silica in a gravimetric ratio in the range of 1:2 to 1:4 thereby preparing a mixed powder and incorporating into said mixed powder a calcium phosphate compound in an amount in the range of 10 to 60% by weight, based on the amount of said mixed powder, thereby forming a coating layer on the surface of said bioceramic;

(B) heating said bioceramic inert to vital tissues now provided with said coating layer thereby converting said coating layer into a solid solution containing aluminum phosphate formed by the reaction of calcium phosphate compound with alumina; and

(C) cooling the resultant of (B), thereby accelerating crystallization of the coating layer.

4,988,363

DETERGENT BLEACH COMPOSITION AND METHOD OF CLEANING FABRICS

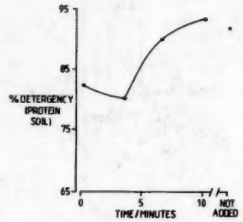
Stephen G. Barnes, Hooton, Great Britain, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 189,578, May 3, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 366,218

Claims priority, application United Kingdom, May 6, 1987, 8710690

Int. Cl.[5] D06L *3/02, 3/04*

U.S. Cl. 8—111 6 Claims



1. A method for washing and cleaning of fabrics using a detergent composition containing an organic peroxyacid in an effective amount to bleach said fabrics, a surfactant and a detergent builder each present in an effective amount to clean said fabrics, comprising the steps of contacting the fabric with an aqueous solution of said detergent composition at a pH of 9.5–11.0 for about 4–10 minutes, and thereafter acidifying the aqueous solution to a pH of 7.3–8.5 for the rest of the washing period.

4,988,364

COATED CATION EXCHANGE YARN AND PROCESS

Stephen A. Perusich, Newark, and James T. Keating, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 28, 1989, Ser. No. 316,636

Int. Cl.[5] B05D *3/06, 3/10;* D06M *14/10, 14/28, 15/256, 101/22*

U.S. Cl. 8—115.52 18 Claims

1. A cation exchange yarn comprising:

(a) an inner core, said inner core comprising a fluorinated cation exchange copolymer having a mole ratio of non-functional to functional monomer of about 2.8–11.8:1, being first oriented and then hydrolyzed sufficiently to achieve a tenacity of at least 0.5 grams per denier and a tensile modulus of at least 2 grams per denier, and having a denier of between 50 and 400 after orientation and

(b) an outer coating on the inner core, said outer coating comprising a melt-fabricable form of a fluorinated cation exchange copolymer having mole ratio of non-functional to functional monomer differing from that of the core by no more than 3 units.

4,988,365

PROCESS FOR THE DYEING AND PRINTING OF CELLULOSE FIBERS IN THE ABSENCE OF ALKALI OR REDUCING AGENTS: PRE TREATMENT WITH MODIFIED AMINE

Klaus Sternberger, Bad Vilbel, and Karl-Heinz Keil, Hanau, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,308

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831464

Int. Cl.[5] D06P *1/30, 3/60;* D06M *15/55*

U.S. Cl. 8—543 6 Claims

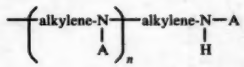
1. A process for the dyeing and printing of cellulose fibers by means of reactive dyes, direct dyes, acid dyes, water-soluble sulfur dyes or sulfur vat dyes in the absence of alkali or reducing agents, which comprises pretreating the textile material to be dyed with a wetting agent and a reaction product of an epihalogenohydrin with ammonia or an amine of the formula

in which

A is hydrogen, alkyl having 1 to 5 carbon atoms, hydroxyalkyl having 1 to 5 carbon atoms,

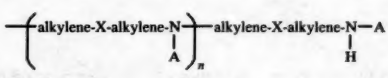
R is alkyl having 1 to 5 carbon atoms, hydroxyalkyl having 1 to 5 carbon atoms,

a group of the formula



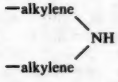
wherein n=0 to 5,

a group of the formula



wherein X=oxygen or sulfur, and n=0 to 5,

or R and A together are



and alkylene is in each case C_1–C_6-alkylene, subsequently dyeing them by conventional methods, but without alkali, by means of the dyes mentioned, and completing the dyeing by rinsing, soaping and drying.

4,988,366

HIGH CONVERSION TAME AND MTBE PRODUCTION PROCESS

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 24, 1989, Ser. No. 427,221

Int. Cl.[5] C10L *1/18*

U.S. Cl. 44—449 21 Claims

1. A process for the production of methyl tertiary butyl ether and methyl tertiary amyl ether in high yield, comprising:

contacting methanol and a feedstream comprising C_5 hydrocarbon rich in isoamylene with acidic etherification catalyst in a first etherification zone under isoamylene etherification conditions;

separating effluent from said first etherification zone to produce a stream comprising unreacted methanol and C_5 hydrocarbon and a product stream comprising methyl tertiary amyl ether;

introducing said unreacted methanol and hydrocarbon stream, fresh methanol and a feedstream comprising C_4 hydrocarbon rich in isobutylene into a second etherification zone under iso-olefins etherification conditions in contact with acidic etherification catalyst;

separating effluent from said second etherification zone to produce a stream comprising unreacted methanol and C_4

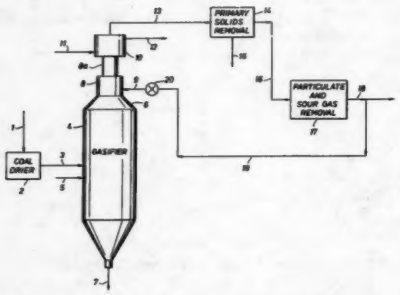
hydrocarbons and a product stream comprising methyl tertiary butyl ether and methyl tertiary amyl ether.

4,988,367

PROCESS FOR REMOVAL OF FLYASH DEPOSITS

Günter K. Eckstein, Hamburg, Fed. Rep. of Germany, assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 29, 1987, Ser. No. 138,765
Int. Cl.[5] C10J 3/00
U.S. Cl. 48—203 2 Claims



1. A process for the gasification of coal comprising (a) oxidizing particulate coal under conditions to produce an impure synthesis gas at a temperature of from about 1050° C. to about 1800° C. and containing molten flyslag particles; (b) passing said synthesis gas to a quench zone having a wall or walls cooler than the melting point of said flyslag particles, and contacting the synthesis gas with a cooler quenching gas in said quench zone and quenching said impure synthesis gas, flyslag depositing on the wall or walls in contact with the synthesis gas, and recovering impure synthesis gas from said quench zone; (c) reducing or stopping the flow of cooler quenching gas to said quench zone for a time sufficient to allow the temperature of the deposited flyslag in the quench zone to increase and flyslag to melt and flow from at least a portion of said wall or walls through the quench zone; and (d) resuming the flow of cooler quenching gas to the quench zone as set forth in step (b).

4,988,368

METHOD FOR DETERMINATION OF SLAG TAP BLOCKAGE

Otto E. Grenwelge Jr., Katy, and Lloyd A. Clomburg, Jr., Houston, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 28, 1989, Ser. No. 458,038
Int. Cl.[5] C10J 3/46
U.S. Cl. 48—210 18 Claims

1. A process for monitoring the open cross sectional area of the slag tap of a gasifier for the gasification of coal to detect changes therein, while carrying out process for the partial oxidation of coal in the gasifier, comprising

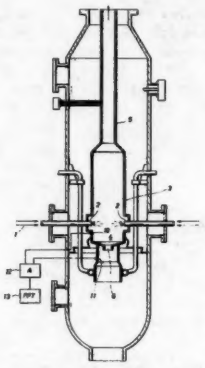
(a) providing at least one first pressure transducer in said gasifier;

(b) providing at least one second pressure transducer at a locus proximate the slag tap outside the gasifier;

(c) concomitantly receiving sound pressure generated in said gasifier in both the at least one first pressure transducer and the at least one second pressure transducer, and transmitting from each of said transducers a time domain electrical signal proportionate to the amplitude of the sound pressure received by each of said respective transducer;

(d) converting said time domain signals respectively to mathematically complex signals in the frequency domain proportional to their pressure magnitudes;

(e) comparing the frequency domain signal from the at least one transducer below the slag tap to the frequency domain signal from the at least one transducer in the gasifier at a pre-selected frequency, and deriving a frequency response function from the comparison;



(f) comparing the magnitude of said function with a predetermined value.

4,988,369

AGGLOMERATED ABRASIVE MATERIAL, COMPOSITIONS COMPRISING SAME, AND PROCESSES FOR ITS MANUFACTURE

Galip Akay, Heswall, England, assignor to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Aug. 9, 1988, Ser. No. 230,097
Claims priority, application United Kingdom, Aug. 11, 1987, 8718987
Int. Cl.[5] B24D 3/00
U.S. Cl. 51—293 8 Claims

1. A process for the manufacture of agglomerated abrasive material, the process comprising a first step of forming a continuous melt of an inorganic filler material and a polymeric binding agent selected from the group of the high molecular weight polyalkylenes, the copolymers thereof with each other, the copolymers thereof with up to 30% by weight of monomers containing a carboxylic acid or ester group, and the mixtures thereof, and a second step of adding further inorganic filler to the continuous melt in a sufficient amount to raise the weight ratio of inorganic filler to polymeric binding agent above a level at which the melt spontaneously crumbles into particles comprising said filler agglomerated and coated by said binding agent.

4,988,370

ALUMINA BONDED ABRASIVE FOR CAST IRON

Douglas G. Haynes, Jr., Grand Island, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 245,589, Sep. 19, 1988, Pat. No. 4,883,501, which is a continuation of Ser. No. 666,131, Oct. 30, 1984, Pat. No. 4,800,685, which is a continuation of Ser. No. 615,663, May 31, 1984, abandoned, which is a continuation of Ser. No. 536,830, Sep. 30, 1983, abandoned, which is a continuation of Ser. No. 331,442, Dec. 15, 1981, abandoned. This application Jul. 27, 1989, Ser. No. 392,825
Int. Cl.[5] B24D 3/02
U.S. Cl. 51—309 7 Claims

1. A bonded abrasive in the form of a wheel comprising sol-gel alumina abrasive grain, alumina zirconia abrasive grain, and a binder material.

4,988,371
NOVEL ALICYCLIC POLYIMIDE GAS SEPARATION MEMBRANES

Thomas O. Jeanes, Antioch; John D. Summers, Walnut Creek, and Edgar S. Sanders, Jr., Pittsburg, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 12, 1989, Ser. No. 406,675
Int. Cl.[5] B01D *53/72, 71/64*
U.S. Cl. 55—16 **17 Claims**

1. A process of separating gases comprising:

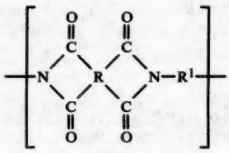
(1) contacting one side of a semi-permeable gas separation membrane with a feed gas mixture under pressure, wherein the membrane divides a separation chamber into a high pressure side into which the feed gas mixture is fed and a low pressure side;

(2) maintaining a pressure differential across the membrane under conditions such that at least one component in the feed gas mixture selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;

(3) removing from the low pressure side of the membrane permeated gas which is enriched in the selectively permeating component(s); and

(4) removing from the high pressure side of the membrane non-permeated gas which is depleted in the selectively permeating component(s);

wherein the membrane comprises a thin discriminating layer of a polyimide corresponding to the formula:



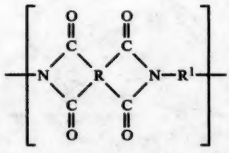
and R is the tetravalent residue of an alicyclic dianhydride in which:

A. both anhydride moieties of the dianhydride are directly attached to the alicyclic ring structure through ortho-linkages, or

B. one anhydride moiety is directly attached to the alicyclic ring structure and the alicyclic ring structure possesses at least one degree of unsaturation; and

R^1 is the divalent residue of an aliphatic, alicyclic, or aromatic diamine.

8. A semi-permeable gas separation membrane comprising a thin discriminating layer of an aliphatic polyimide having repeating units corresponding to the formula:



wherein R is the tetravalent residue of an alicyclic dianhydride in which:

A. both anhydride moieties of the dianhydride are directly attached to the alicyclic ring structure through ortho-linkages, or

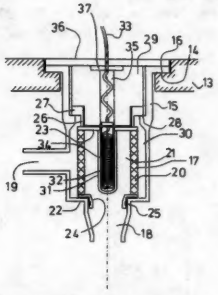
B. one anhydride moiety is directly attached to the alicyclic ring structure and the alicyclic ring structure possesses at least one degree of unsaturation; and

R^1 is the divalent residue of an aliphatic, alicyclic, or aromatic diamine.

4,988,372
METHOD AND DEVICE FOR FILTERING CONTAMINATED GASES LADEN WITH LIQUID VESICLES

Francois Meline, Paris, France, assignor to Societe Anonyme: Compagnie Generale des Mattieres Nucleaires, Velizy-villacoublay, France

Filed Nov. 13, 1989, Ser. No. 434,160
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—97 **12 Claims**

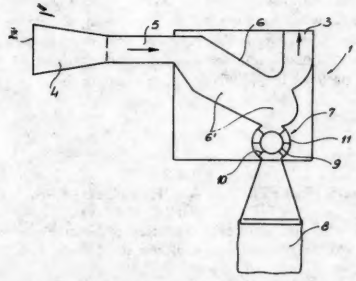


1. Method for filtering a contaminated gas laden with liquid vesicles, otherwise called an aerosol, through a filter medium arranged around a center hollow through which the aerosol enters, whereby said filter medium is heated to a temperature higher than the dew point of the aerosol by a radiant source arranged in said center hollow.

4,988,373
IMPURITY SEPARATOR FOR CLEANING STAPLE COTTON

Pietro B. Marzoli, and Mario Mascheretti, both of Via Durante, 1, Palazzolo sull'Oglio (BS), Italy

Filed Nov. 3, 1989, Ser. No. 432,039
Claims priority, application Italy, Jun. 1, 1989, 20726 A/89
Int. Cl.[5] B01D *45/00*
U.S. Cl. 55—461 **1 Claim**



1. An impurity separator for cleaning staple cotton comprising a cotton staple delivery duct including a tapering inlet duct portion and a rectilinear constant cross-section duct portion, a downward slanted box member having a top open end communicating with said constant cross-section duct portion a bottom open end and an intermediate open end, a cleaned staple cotton delivery vertical duct communicating with said intermediate open end of said box member and an unspinnable waste material removing device, said device including a housing encompassing a rotary blade wheel, said housing having an open top communicating with said bottom open end of said box member and an open bottom communicating with an unspinnable waste

collecting chamber, said top open end of said box member being arranged at a higher level than said intermediate open end thereof.

4,988,374

METHOD AND APPARATUS FOR CONTAMINANT REMOVAL IN MANUFACTURING OPTICAL FIBRE

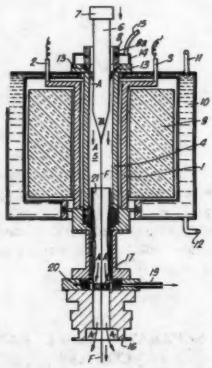
Ian D. Harding, Saffron Walden; Peter R. Ince, Brentwood, and Roger S. Preston, Upminster, all of Great Britain, assignors to STC PLC, London, England

Filed Nov. 14, 1988, Ser. No. 270,234

Claims priority, application United Kingdom, Nov. 12, 1987, 8726508

Int. Cl.[5] C03B *37/02*

U.S. Cl. 65—2 8 Claims



1. A method of operating an optical fibre drawing furnace having a preform entrance and fibre exit, comprising providing the furnace with a duct, running the furnace at a temperature in the range suitable for drawing optical fibre from a preform, melting a preform in the furnace progressively and drawing a fibre from the preform, extracting gases from the duct so that contaminants produced by the drawing process traverse said duct, and become deposited on said duct, ceasing drawing said fibre, and, while maintaining the furnace at or near said temperature, and closing the entrance and exit, removing the deposited contaminant, and finally drawing further fibre from a fibre preform in the furnace after opening the entrance and exit.

4,988,375

METHOD FOR FITTING A SPHERICAL LENS INTO AN OPTICAL COUPLING DEVICE

Christian Bornhauser, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

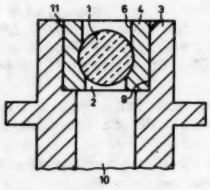
Filed Aug. 22, 1989, Ser. No. 396,955

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3829067

Int. Cl.[5] C03B *23/20;* G02B *6/36*

U.S. Cl. 65—59.4 12 Claims

1. A method for making a highly precise, airtight fit of a spherical lens within a metallic body, forming a cylindrical opening in the metallic body, the diameter of the cylindrical opening being sufficiently smaller than the diameter of the spherical lens that insertion of the spherical lens into the opening will result in plastic deformation of an inside wall of the opening of the metallic body, and axially pressing the spherical lens into the cylindrical opening thereby plastically deforming an inside wall of the opening of the metallic body, such that the



diameter of said cylindrical opening is enlarged due to said plastic deformation.

4,988,376

GLASSIFICATION OF LEAD AND SILICA SOLID WASTE

Glenn M. Mason, and Gerald Gardner, both of Laramie, Wyo., assignors to Western Research Institute, Laramie, Wyo.

Filed Aug. 2, 1989, Ser. No. 388,372

Int. Cl.[5] C03B *5/02;* C03C *3/07*

U.S. Cl. 65—134 13 Claims

1. A process for treating solid wastes lead contaminated soils and waste containing lead containing paint chips in solid waste immobile consisting essentially of heating said solid wastes with a fluxing agent to a temperature sufficient to melt silica present in said solid waste and the lead contained therein, to form a slag and recovering the slag so formed.

4,988,377

COATINGS WITH SULFONATED POLYMERS

Pacifico V. Manalastas, Edison; Warren A. Thaler, Flemington; Evelyn N. Drake, Lebanon, all of N.J., and Israel S. Pasternak, Sarnia, Canada, assignors to Exxon Research and Engineering Company, Florham Park, N.J.

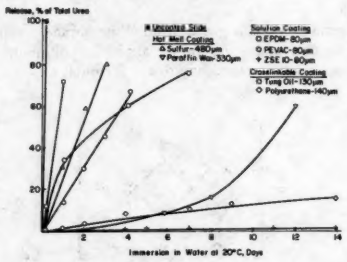
Continuation of Ser. No. 855,349, Apr. 24, 1986, abandoned.

This application Jul. 31, 1989, Ser. No. 387,059

The portion of the term of this patent subsequent to Oct. 20, 2003, has been disclaimed.

Int. Cl.[5] C05C *9/00;* C05G *3/10*

U.S. Cl. 71—28 15 Claims



1. A composite comprising:

(a) a substrate selected from the group consisting of a urea, a fertilizer and a micro nutrients; and

(b) a polymeric coating adhered to at least one surface of said substrate, said coating having a thickness of about 1 to about 100 micrometers, wherein said elastomeric coating comprises a neutralized sulfonated polymer having a sulfonate content of about 4 to about 200 meq. per 100 grams of said neutralized polymers said coating being substantially free of pinholes.

4,988,378

HERBICIDAL SUBSTITUTED THIADIAZOLYLOXYACETAMIDES

Heinz Förster, Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

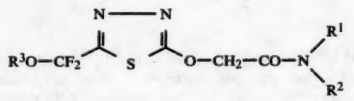
Filed Jun. 15, 1989, Ser. No. 366,578

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, 3821599

Int. Cl.[5] C07D *288/12, 414/12;* A01W *43/82*

U.S. Cl. 71—90 16 Claims

1. A substituted thiadiazolyloxyacetamide of the formula



(I)

in which

R^1 stands for hydrogen, C_1–C_8-alkyl which is optionally substituted by fluorine, chlorine, cyano or C_1–C_4-alkoxy, for C_2–C_8-alkenyl which is optionally substituted by fluorine and/or chlorine, for C_2–C_8-alkinyl or for benzyl,

R^2 stands for C_1–C_8-alkyl which is optionally substituted by fluorine, chlorine, cyano or C_1–C_4-alkoxy, for C_2–C_8-alkenyl which is optionally substituted by fluorine and/or chlorine, for C_2–C_8alkinyl, for C_3–C_6-cycloalkyl which is optionally substituted by chlorine and/or C_1–C_3-alkyl, for C_5- or C_6-cycloalkenyl, for benzyl which is optionally substituted by fluorine, chlorine and/or C_1–C_4-alkyl, for phenyl which is optionally substituted by fluorine, chlorine, bromine, iodine, cyano, nitro, C_1–C_4-alkyl, trifluoromethyl, C_1–C_4-alkoxy and/or C_1–C_4-alkylthio, for C_1–C_8-alkoxy which is optionally substituted by C_1–C_4-alkoxy, or for C_3–C_4-alkenyloxy, or R^1 and R^2 together with the nitrogen atom to which they are bonded form a saturated or unsaturated, five- to seven-membered nitrogen heterocycle which is optionally monosubstituted to trisubstituted by C_1–C_3-alkyl and which is optionally benzo-fused, and

R^3 stands for C_1–C_6-alkyl which is optionally substituted by halogen, C_1–C_4-alkoxy, C_1–C_4-alkylsulphonyl, phenyl, phenoxy or phenyl–C_1–C_4-alkoxy, the phenyl component being optionally substituted by halogen, C_1–C_4-alkyl, trifluoromethyl and/or C_1–C_4-alkoxy.

4,988,379

SULPHONYLISO(THIO)UREA DERIVATIVES AS HERBICIDES

Hans-Joachim Diehr; Christa Fest, both of Wuppertal; Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Klaus-Helmut Müller, Duesseldorf; Theodor Pfister, Monheim; Uwe Priesnitz, Solingen; Hans-Jochem Riebel, Wuppertal; Wolfgang Roy, Langenfeld; Hans-Joachim Santel, Cologne; Robert R. Schmidt, Bergisch Gladbach, and Ludwig Eue, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

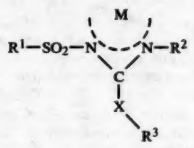
Division of Ser. No. 769,272, Aug. 23, 1985. This application Jan. 4, 1989, Ser. No. 293,275

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431921; May 17, 1985, 3517844

Int. Cl.[5] A01N *43/02;* C07D *253/00, 251/02*

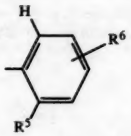
U.S. Cl. 71—90 7 Claims

1. A sulphonyliso(thio)urea derivative of the formula



in which

R^1 represents the radical



wherein

R^5 and R^6 are identical or different and represent hydrogen, halogen, cyano, nitro, C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylaminocarbonyl, di-(C_1–C_4-alkyl)-amino-carbonyl, hydroxyl, C_1–C_4-alkoxy, formyloxy, C_1–C_4-alkyl-carbonyloxy, C_1–C_4-alkoxy-carbonyloxy, C_1–C_4-alkylamino-carbonyloxy, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, di-(C_1–C_4-alkyl)-aminosulphonyl, C_3–C_6-cycloalkyl or phenyl), or represent C_2–C_6-alkenyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, C_1–C_4-alkoxy-carbonyl, carboxyl or phenyl), or represent C_2–C_6-alkinyl (which is optionally substituted by fluorine, chlorine bromine, cyano, C_1–C_4-alkoxy-carbonyl, carboxyl or phenyl), or represent C_1–C_4-alkoxy (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), or represent C_1–C_4-alkylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), or represent C_3–C_6-alkenyloxy (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-alkoxy-carbonyl), or represent C_2–C_6-alkenylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, C_1–C_3-alkylthio or C_1–C_4-alkoxy-carbonyl), C_3–C_6-alkinyloxy, C_3–C_6-alkinylthio, or represent the radical $—S(O)_p—R^7$

wherein

p represents the numbers 1 or 2 and

R^7 represents C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-alkoxy-carbonyl), C_3–C_6-alkenyl, C_3–C_6-alkinyl, C_1–C_4-alkoxy, C_1–C_4-alkoxy-amino, C_1–C_4-alkoxy-C_1–C_4-alkyl-amino, C_1–C_4-alkylamino or di-(C_1–C_4-alkyl)-amino, or

R^5 and R^6 furthermore represent phenyl or phenoxy, or represent C_1–C_4-alkylcarbonylamino. C_1–C_4-alkoxy-carbonylamino, C_1–C_4-alkylamino-carbonylamino or di-(C_1–C_4-alkyl)-amino-carbonylamino, or represent the radical $—CO—R^8$,

wherein

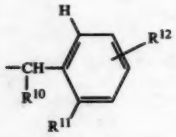
R^8 represents C_1–C_6-alkyl, C_1–C_6-alkoxy, C_3–C_6-cycloalkoxy, C_3–C_6-alkenyloxy, C_1–C_4-alkylthio, C_1–C_4-alkylamino, C_1–C_4-alkoxyamino, C_1–C_4-alkoxy-C_1–C_4-alkyl-amino or di-(C_1–C_4-alkyl)-amino (which are optionally substituted by fluorine and/or chlorine), or R^5 and R^6 furthermore represent C_1–C_4-alkylsulphonyloxy, di-(C_1–C_4-alkyl)-aminosulphonylamino or the radical $—CH=N—R^9$,

wherein

R^9 represents C_1–C_6-alkyl which is optionally substituted by fluorine, chlorine, cyano, carboxyl, C_1–C_4-alkoxy, carbonyl, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl, or represents benzyl which is optionally substituted by fluorine or chlorine, or represents C_3–C_6-alkenyl or C_3–C_6-alkinyl, optionally substituted by fluorine or chlorine, or represents phenyl which is optionally substituted by fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, trifluoromethyl, trifluoromethoxy or trifluoromethylthio, or represents C_1–C_6-alkoxy, C_3–C_6-alkenoxy, C_3–C_6-alkinoxy or benzyloxy, optionally substituted by fluorine and/or chlorine, or represents amino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)amino, phenylamino, C_1–C_4-alkyl-carbonyl-amino, C_1–C_4-alkoxy-carbonylamino or C_1–C_4-alkyl-sulphonlamino, or represents phenylsulphonylamino which is optionally substituted by fluorine, chlorine, bromine or methyl;

or wherein, furthermore,

R^1 represents the radical



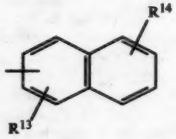
wherein

R^{10} represents hydrogen or C_1–C_4-alkyl and

R^{11} and R^{12} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylsulphonyl or di-(C_1–C_4-alkyl)-aminosulphonyl;

or wherein, furthermore,

R^1 represents the radical

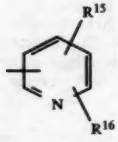


wherein

R^{13} and R^{14} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine) or C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine);

or wherein, furthermore,

R^1 represents the radical

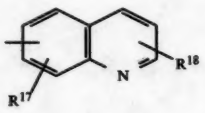


wherein

R^{15} and R^{16} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine) or C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), or represent C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), or represent di-(C_1–C_4-alkyl)-aminosulphonyl or C_1–C_4-alkoxycarbonyl;

or wherein, furthermore,

R^1 represents the radical

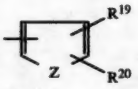


wherein

R^{17} and R^{18} are identical or different and represent hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or bromine) or C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), or represent C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), or represent di-(C_1–C_4-alkyl)-aminosulphonyl;

or wherein, furthermore,

R^1 represents the radical



wherein

R^{19} and R^{20} are identical or different and represent hydrogen, fluorine, chlorine, bromine, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which is optionally substituted by fluorine and/or chlorine), di-(C_1–C_4-alkyl)-amino-sulphonyl or C_1–C_4-alkoxy-carbonyl and

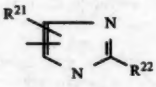
Z represents oxygen, sulphur or the grouping N-Z^1,

wherein

Z^1 represents hydrogen, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine or cyano), C_3–C_6-cycloalkyl, benzyl, phenyl (which is optionally substituted by fluorine, chlorine, bromine or nitro), C_1–C_4-alkyl-carbonyl, C_1–C_4-alkoxy-carbonyl or di-(C_1–C_4-alkyl)-aminocarbonyl;

or wherein, furthermore,

R^1 represents the radical



wherein

R^{21} represents hydrogen, C_1–C_5-alkyl or halogen

R^{22} represents hydrogen or C_1–C_5-alkyl and

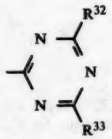
Y represents sulphur or the grouping N-R^{23}

wherein

R^{23} represents hydrogen or C_1–C_5-alkyl;

and wherein, furthermore,

R^2 represents the radical



wherein

R^{32} and R^{33} are identical or different and represent fluorine, chlorine, bromine, hydroxyl, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_3–C_5-cycloalkyl, C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine) or C_1–C_4-alkylthio, or represent C_1–C_4-alkyl-amino or di-(C_1–C_4-alkyl)-amino;

or wherein, furthermore,

R^3 represents a phenyl radical, which is optionally substituted by one or more of the radicals from the group consisting of halogen, cyano, nitro, hydroxyl, carboxyl, C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, bromine, nitro, cyano, hydroxyl, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio or phenyl), C_3–C_6-cycloalkyl, C_1–C_4-alkoxy (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio or C_1–C_4-alkoxy-carbonyl), C_1–C_4-alkylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl or C_1–C_4-alkoxy-carbonyl), amino, C_1–C_4-alkyl-amino and di-(C_1–C_4-alkyl)-amino (which are optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy or C_1–C_4-alkoxy-carbonyl), C_1–C_4-alkyl-carbonyl-amino, C_1–C_4-alkoxy-carbonyl-amino, (di)-C_1–C_4-alkylaminocarbonyl-amino, formyl, C_1–C_4-alkyl-carbonyl, benzoyl, C_1–C_4-alkoxy-carbonyl, phenoxy-carbonyl, benzyloxycarbonyl, phenyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, hydroxyl or methyl), phenoxy, phenylthio, phenylsulphonyl, phenylamino and phenylazo (which are optionally substituted by fluorine, chlorine, bromine, cyano, nitro, methyl and/or trifluoromethyl), pyridoxy and pyrimidoxy (which are optionally substituted by fluorine, chlorine, bromine, cyano, nitro, methyl and/or trifluoromethyl), C_1–C_4-alkyl-carbonyloxy, C_1–C_4-alkoxy-carbonyloxy, C_1–C_4-alkyl-amino-carbonyloxy and di-(C_1–C_4-alkyl)-amino-carbonyloxy, or which is optionally fused with an alkylene chain (which is optionally branched and/or interrupted by one or more oxygen atoms) or a benzo radical (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, methyl and/or trifluoromethyl);

and wherein, furthermore,

X represents oyygen or sulphur and

M represents hydrogen or one equivalent of sodium, potassium, magnesium, calcium, aluminium, manganese, iron, cobalt or nickel,

or an adduct thereof with a strong acid.

5. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a compound or adduct thereof according to claim **11**.

4,988,380

USE OF DIFLUOROMETHYL-THIADIAZOLYL-OXYACETAMIDES AS SELECTIVE HERBICIDES

Heinz Förster, Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

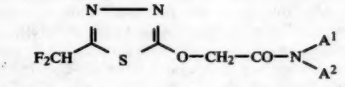
Filed Jun. 15, 1989, Ser. No. 366,579

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, 3821597

Int. Cl.[5] **C07D** *285/12;* **A01N** *43/82*

U.S. Cl. 71—90 **9 Claims**

1. A difluoromethyl-thiadiazolyl-oxyacetamide of the formula



in which

A^1 stands for C_2–C_4-alkyl and

A^2 stands for phenyl which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, methyl, ethyl, trifluoromethyl, methoxy and/or ethoxy.

4,988,381

HERBICIDAL SUBSTITUTED 4-SULPHONYLAMINO-2-AZINYL-1,2,4-TRIAZOL-3-ONES

Klaus-Helmut Müller, Duesseldorf; Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Klaus König, Odenthal; Hans-Jochem Riebel; Peter Babczinski, both of Wuppertal; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

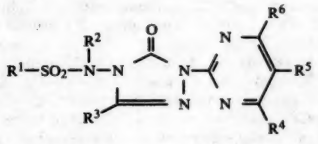
Filed Jul. 19, 1989, Ser. No. 382,163

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825602; Jan. 16, 1989, 3901084

Int. Cl.[5] **A01N** *43/54;* **C07D** *403/04*

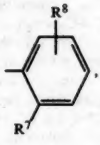
U.S. Cl. 71—92 **13 Claims**

1. A substituted sulphonylaminotriazolinone of the formula



in which

R^1 represents the radical



where

R^7 and R^8 are identical or different and represent hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylaminocarbonyl, di-(C_1–C_4-alkyl)aminocarbonyl, hy-

droxyl, C_1–C_4-alkoxy, formyloxy, C_1–C_4-alkyl-carbonyloxy, C_1–C_4-alkoxycarbonyloxy, C_1–C_4-alkylaminocarbonyloxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, di-(C_1–C_4-alkyl)aminosulphonyl, C_3–C_6-cycloalkyl or phenyl), represent C_2–C_6-alkenyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, C_1–C_4-alkoxycarbonyl, carboxyl or phenyl), represent C_2–C_6-alkinyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, C_1–C_4-alkoxy-carbonyl, carboxyl or phenyl), represent C_1–C_4-alkoxy (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), represent C_1–C_4-alkylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, C_1–C_4-alkoxy-carbonyl, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl), represent C_3–C_6-alkenyloxy (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-cyano or C_1–C_4-alkoxy-carbonyl), represent C_2C_6-alkenylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, C_1–C_3-alkylthio or C_1–C_4-alkoxycarbonyl), C_3–C_6-alkinyloxy, C_3–C_6-alkinylthio or represent the radical —$S(O)_p$—R^9, where

p represents the numbers 1 or 2 and

R^9 represents fluorine, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano or C_1–C_4-alkoxy-carbonyl), C_3–C_6-alkenyl, C_3–C_6-alkinyl, C_1–C_4alkoxy, C_1-–alkoxy-C_1–C_4-alkylamino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)-amino or represents the radical —NHOR^{10}, where

R^{10} represents C_1–C_6-alkyl (which is optionally substituted by fluorine, chlorine, cyano, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, C_1–C_4-alkyl-carbonyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylaminocarbonyl or di-(C_1–C_4-alkyl)-aminocarbonyl), represents C_3–C_6-alkenyl (which is optionally substituted by fluorine, chlorine or bromine), C_3–C_6-alkinyl, C_3–C_6-cycloalkyl, C_3–C_6-cycloalkyl-C_1–C_2-alkyl, phenyl-C_1–C_2-alkyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy or C_1–C_4-alkoxy-carbonyl, represents benzhydryl or represents phenyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, C_1–C_4-alkyl, trifluoromethyl, C_1–C_4-alkoxy, C_1–C_2-fluoroalkoxy, C_1–C_4-alkylthio, trifluoromethylthio or C_1–C_4-alkoxycarbonyl),

R^7 and/or R^8 furthermore represent phenyl or phenoxy, C_1–C_4-alkylcarbonylamino, C_1–C_4-alkoxy-carbonylamino, C_1–C_4-alkylaminocarbonyl-amino, di-(C_1–C_4-alkyl)-aminocarbonylamino, or represent the radical —CO—R^{11}, where

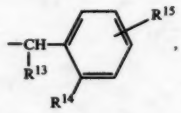
R^{11} represents C_1–C_6-alkyl, C_1–C_6-alkoxy, C_3–C_6-cycloalkoxy, C_3–C_6-alkenyloxy, C_1–C_4 alkylthio, C_1–C_4-alkylamino, C_1–C_4-alkoxyamino, C_1–C_4-alkoxy-C_1–C_4-alkyl-amino or di-(C_1–C_4-alkyl)-amino (which are optionally substituted by fluorine and/or chlorine),

R^7 and/or R^8 furthermore represent C_1–C_4-alkylsulphonyloxy, di-(C_1–C_4-alkyl)-aminosulphonylamino or the radical —CH=N—R^{12}, where

R^{12} represents C_1–C_6-alkyl which is optionally substituted by fluorine, chlorine, cyano, carboxyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl, represents benzyl which is optionally substituted by fluorine or chlorine, represents C_3–C_6-alkenyl or C_3–C_6-alkinyl, each of which is optionally substituted by fluorine or chlorine, represents phenyl which is optionally substituted by fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, trifluoromethyl, trifluoromethoxy or trifluoromethylthio, represents C_1–C_6-alkoxy, C_3–C_6-alkenoxy, C_3–C_6-alkinoxy or benzyloxy, each of which is optionally substituted by fluorine and/or chlorine, represents amino, C_1–C_4-alkylamino, di-(C_1–C_4-alkyl)-amino, phenylamino, C_1–C_4-alkyl-carbonylamino, C_1–C_4-alkoxy-carbonylamino, C_1–C_4-alkylsulphonylamino or represents phenylsulphonylamino which is optionally substituted by fluorine, chlorine, bromine or methyl,

where furthermore

R^1 represents the radical

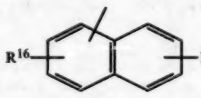


where

R^{13} represents hydrogen or C_1–C_4-alkyl,

R^{14} and R^{15} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), carboxyl, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkylsulphonyl or di-(C_1–C_4-alkyl)-aminosulphonyl; where furthermore

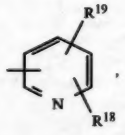
R^1 represents the radical



where

R^{16} and R^{17} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine) or C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine); where furthermore

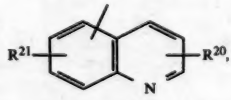
R^1 represents the radical



where

R^{18} and R^{19} are identical or different and represent hydrogen, fluorine, chlorine, bromine, nitro, cyano, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_2–C_4-alkenyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), represents C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and-/or chlorine), and represents di-(C_1–C_4-alkyl)-aminosulphonyl, C_1–C_4-alkoxy-carbonyl, dimethylaminocarbonyl or dioxolanyl; where furthermore

R^1 represents the radical

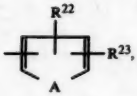


where

R^{20} and R^{21} are identical or different and represent hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or bromine), C_1–C_4-alkoxy (which is optionally substituted by fluorine

and/or chlorine), represent C_1–C_4-alkylthio, C_1–C_4-alkylsulphonyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), or represent di-(C_1–C_4-alkyl)-aminosulphonyl; where furthermore

R^1 represents the radical



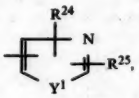
where

R^{22} and R^{23} are identical or different and represent hydrogen, fluorine, chlorine, bromine, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, C_1–C_4-alkoxy and/or C_1–C_4-halogenoalkoxy), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl or C_1–C_4-alkylsulphonyl (which is optionally substituted by fluorine and/or chlorine), di-(C_1–C_4-alkyl)-aminosulphonyl or C_1–C_4-alkoxycarbonyl, and

A represents oxygen, sulphur or the group N—Z^1, where

Z^1 represents hydrogen, C_1–C_4-alkyl (which is optionally substituted by fluorine, chlorine, bromine, or cyano), C_3–C_6-cycloalkyl, benzyl, phenyl (which is optionally substituted by fluorine, chlorine, bromine, or nitro), C_1–C_4-alkylcarbonyl, C_1–C_4-alkoxy-carbonyl or di-(C_1–C_4-alkyl)-aminocarbonyl; where furthermore

R^1 represents the radical



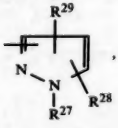
where

R^{24} and R^{25} are identical or different and represent hydrogen, C_1–C_4-alkyl, halogen, C_1–C_4-alkoxycarbonyl, C_1–C_4-alkoxy or C_1–C_4-halogenoalkoxy,

Y^1 represents sulphur or the group N—R^{26}, where

R^{26} represents hydrogen or C_1–C_4-alkyl; where furthermore

R^1 represents the radical



where

R^{27} represents hydrogen, C_1–C_4-alkyl, benzyl, (iso)quinolinyl or phenyl,

R^{28} represents hydrogen, halogen, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy (which is optionally substituted by fluorine and/or chlorine), dioxolanyl or C_1–C_4-alkoxy-carbonyl and

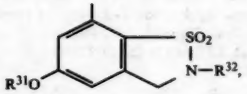
R^{29} represents hydrogen, halogen or C_1–C_4-alkyl; where furthermore

R^1 represents the radical

where

R^{30} represents hydrogen, halogen, C_1–C_4-alkyl, C_1–C_4-halogenoalkyl, C_1–C_4-alkoxy, C_1–C_4-halogenoalkoxy or C_1–C_4-alkoxy-carbonyl; where furthermore

R^1 represents the radical

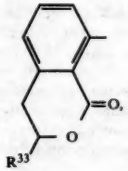


where

R^{31} represents C_1–C_4-alkyl and

R^{32} represents C_1–C_4-alkyl; where furthermore

R^1 represents the radical



where

R^{33} represents hydrogen or methyl

in which furthermore

R^2 represents hydrogen or the group —SO_2-R^1,

in which furthermore

R^3 represents hydrogen, fluorine, chlorine, bromine, iodine, hydroxyl, mercapto, amino or an optionally fluorine- and/or chlorine-substituted radical from the series comprising C_1–C_4-alkyl, C_3–C_6-cycloalkyl, benzyl, phenyl, C_1–C_4-alkoxy, C_3–C_4-alkenyloxy, C_3–C_4-alkinyloxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphony, C_3–C_4-alkenylthio, C_3–C_4alkinylthio, benzyloxy, benzylthio, C_1–C_4-alkylamino and di-(C_1–C_4-alkyl)-amino,

R^4 represents hydrogen, fluorine, chlorine, bromine, hydroxyl, amino, C_1–C_4-alkyl, C_1–C_4-halogenoalkyl, C_1–C_2-alkoxy-C_1–C_2-alkyl, C_1–C_4-alkoxy, C_1–C_4-halogenoalkoxy, C_1–C_2-alkoxy-C_1–C_2-alkoxy, C_1–C_4-alkylthio, C_1–C_4-halogenoalkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, C_1–C_4-alkylamino or di-(C_1–C_2-alkyl)-amino,

R^5 represents hydrogen, fluorine, chlorine, bromine, cyano, methyl, formyl, acetyl, methoxycarbonyl or ethoxycaronyl and

R^6 represents hydrogen, fluorine, chlorine, bromine, C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-halogenoalkoxy, C_1–C_4-alkylthio, C_1–C_4-alkylsulphinyl, C_1–C_4-alkylsulphonyl, C_1–C_4-alkylamino, dimethylamino or diethylamino,

or a salt thereof.

11. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a compound or salt thereof according to claim **1**.

4,988,382

SUBSTITUTED AZOLYLMETHYL-CYCLOPROPYL-CARBINOL DERIVATIVES

Klaus Böckmann, Cologne; Erik Regel, Wuppertal; Karl H. Büchel, Burscheid; Klaus Lürssen, Bergisch Gladbach, and Jörg Konze, Cologne; Wilhelm Brandes, Leichlingen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

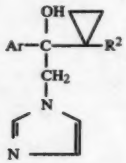
Division of Ser. No. 260,212, Oct. 19, 1988, Pat. No. 4,921,528, which is a continuation of Ser. No. 792,088, Oct. 28, 1985, abandoned. This application Dec. 28, 1989, Ser. No. 458,479

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440116; Jun. 22, 1985, 3522440; Sep. 26, 1985, 3534310

Int. Cl.[5] A01N *43/50;* **C07D** *233/60*

U.S. Cl. 71—92 **9 Claims**

1. A substituted imidazolylmethyl-cyclopropyl-carbinol derivative of the formula



in which

Ar represents phenyl which is optionally monosubstituted or disubstituted by identical or different substituents selected from the group consisting of fluorine, chlorine, methyl, isopropyl, tert.-butyl, methoxy, methylthio, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, and phenyl or phenoxy each of which is optionally substituted by at least one of fluorine, chlorine and methyl; and

R^2 represents fluorine, chlorine, bromine or —X—R^3

wherein

R^3 represents straight-chain or branched alkyl having 1 to 12 carbon atoms, cycloalkyl having 5 to 7 carbon atoms, straight-chain or branched alkenyl having 2 to 12 carbon atoms, hydroxyalkyl having 1 to 12 carbon atoms, alkylthioalkyl having 1 to 4 carbon atoms in the alkylthio part and 1 to 4 carbon atoms in the alkyl part, alkoxycarbonylalkyl having 1 to 4 carbon atoms in the alkyl part, or phenyl or benzyl each of which is optionally monosubstituted or disubstituted by identical or different substituents selected from the group consisting of fluorine, chlorine, methyl, isopropyl, tert.-butyl, methoxy, methylthio, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, and phenyl or phenoxy each of which is optionally substituted by at least one of fluorine, chlorine and methyl; and

X represents oxygen, sulphur, an SO group or an SO_2 group, or an addition product thereof with an acid or metal salt.

4,988,383

FUNGICIDAL AND PLANT GROWTH-REGULATING CYCLOPROPYL-HYDROXYETHYL-AZOLYL-DERIVATIVES

Gerhard Jäger; Udo Kraatz, both of Leverkuse; Stefan Dutzmann, Duesseldorf; Wilhelm Brandes, Leichlingen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

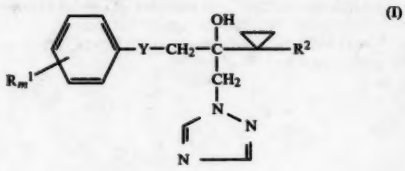
Filed Feb. 6, 1990, Ser. No. 475,640

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1989, 3905316

Int. Cl.[5] A01N *43/653;* **C07D** *249/08*

U.S. Cl. 71—92 **12 Claims**

1. A cyclopropyl-hydroxyethyl-azolyl derivative of the formula



(I)

in which

R^1 represents halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 halogen atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 halogen atoms, halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 halogen atoms, alkoximinomethyl having 1 to 4 carbon atoms in the alkoxy group, phenyl optionally substituted by alkyl having 1 or 2 carbon atoms and/or halogen or phenoxy optionally substituted by alkyl having 1 or 2 carbon atoms and/or halogen,

m represents the numbers 0, 1, 2 or 3,

R^2 represents benzyl which is optionally monosubstituted to trisubstituted in the phenyl moiety by identical or different substituents from the group consisting of halogen, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 halogen atoms, alkyl having 1 to 4 carbon atoms and alkoxy having 1 to 4 carbon atoms, or

R^2 represents the radical of the formula —$COOR^3$, in which

R^3 represents alkyl having 1 to 4 carbon atoms, phenyl optionally substituted by halogen and/or alkyl having 1 to 4 carbon atoms or benzyl optionally substituted by halogen and/or alkyl having 1 to 4 carbon atoms,

and

Y represents oxygen or sulphur,

or an addition product thereof with an acid or metal salt.

4,988,384

PENTA-SUBSTITUTED PYRIDINE COMPOUNDS, HERBICIDAL COMPOSITIONS AND HERBICIDAL METHOD OF USE

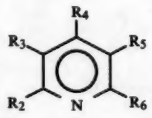
Yuen-Lung L. Sing, St. Louis, and Len F. Lee, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 12,930, Feb. 9, 1987, abandoned. This application Dec. 24, 1987, Ser. No. 134,231

Int. Cl.[5] C07D *413/04, 413/14, 417/04;* **A01N** *43/40*

U.S. Cl. 71—94 **59 Claims**

1. A compound represented by the formula



wherein:

R_3 is selected from the group consisting of 4,5-dihydro-2-oxazolyl and 4,5-dihydro-2-thiazolyl; and the above mentioned heterocycles substituted with one or more substituents selected from lower alkyl, alkoxy and trifluoroacetyl;

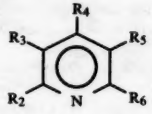
R_4 is selected from C_1–C_4 straight or branched chain alkyl, C_3–C_4 cycloalkyl, cyclopropylmethyl, methylthiomethyl, and bis(methylthiomethyl;

R_5 is the same as R_3 or is

or —C|N where Z_1 is selected from O and S, and Z_2 is selected from methoxy, ethoxy, 2-propenoxy, hydroxy, methylthio, cyanomethoxy, haloethoxy, methoxyethoxyethoxy, chloro, amino, methylamino, and dimethylamino;

R_2 and R_6 are independently selected from fluorinated methyl, chlorofluorinated methyl, chlorinated methyl and lower alkyl, provided that one of R_2 and R_6 must be fluorinated or chlorofluorinated methyl.

39. A herbicidal composition comprising an inert ingredient and an active ingredient represented by the formula



wherein:

R_3 is selected from the group consisting of 4,5-dihydro-2-oxazolyl and 4,5-dihydro-2-thiazolyl; and the above mentioned heterocycles substituted with one or more substituents selected from lower alkyl, alkoxy and trifluoroacetyl;

R_4 is selected from C_1–C_4 straight or branched chain alkyl, C_3–C_4 cycloalkyl, cyclopropylmethyl, methylthiomethyl, and bis(methylthiomethyl;

R_5 is the same as R_3 or is

or —C|N where Z_1 is selected from O and S, and Z_2 is selected from methoxy, ethoxy, 2-propenoxy, hydroxy, methylthio, cyanomethoxy, haloethoxy, methoxyethoxyethoxy, chloro, amino, methylamino, and dimethylamino;

R_2 and R_6 are independently selected from fluorinated methyl, chlorofluorinated methyl, chlorinated methyl and lower alkyl, provided that one of R_2 and R_6 must be fluorinated or chlorofluorinated methyl.

8. A herbicidal composition which comprises a compound as claimed in claim **1** together with at least one carrier.

4,988,385

HERBICIDAL ACRYLONITRILE DERIVATIVES

Terence Gilkerson, Canterbury, and Robert W. Shaw, Sittingbourne, both of England, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

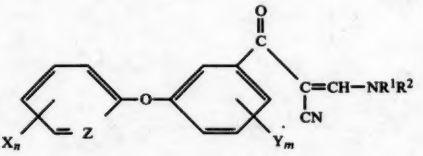
Filed May 26, 1989, Ser. No. 357,276

Claims priority, application United Kingdom, Jun. 22, 1988, 8814881

Int. Cl.[5] **C07C** *255/07;* **A01N** *37/34*

U.S. Cl. 71—98 **11 Claims**

1. A compound of the general formula I



(I)

in which R^1 and R^2 each independently represents an alkyl group, Z represents a group CH which is unsubstituted or substituted by a substituent X, m is 0 or an integer from 1 to 4, the Y or each Y independently represents a halogen atom, n is 0 or an integer from 1 to 5, and the or each X independently represents a halogen atom or a group selected from alkyl, haloalkyl, cyanoalkyl, alkenyl, alkynyl, alkenyloxy, alkynyloxy, alkoxy, alkylthio, alkenylthio, alkynylthio, cyano, nitro, alkylsulphonyl, alkylsulphinyl and sulphonamido.

4,988,386

COPPER-TUNGSTEN METAL MIXTURE AND PROCESS

James B. Oenning, Camarillo, and Ian S. R. Clark, San Diego, both of Calif., assignors to Fine Particles Technology Corporation, Auburn, Calif.

Filed Jun. 29, 1988, Ser. No. 212,861

Int. Cl.[5] **B22F** *1/00*

U.S. Cl. 75—247 **7 Claims**

1. A composition of matter formed by the metal injection molding process comprising:

a copper-tungsten material comprising from approximately 5 to 50 percent by weight of copper, exhibiting hermeticity with a leak rate of less than about 1×10^{-9} cm^3 of helium/-sec., a thermal conductivity in the range of from more than about 0.40 at about 5 weight percent copper, to more than about 0.68 calorie-cm/cm^2 sec. degrees centigrade at about 50 weight percent copper, and a rate of thermal expansion in the range of from about 5.5 parts per million/degree centigrade at about 5 weight percent copper, to about 11.7 parts per million/degree centigrade at about 50 weight percent copper.

4,988,387

AGENT AND PROCESS FOR DESULFURIZING MOLTEN METALS

Hermann Schrödter, Erftstadt, and Albert Braun, Hürth, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 27, 1990, Ser. No. 485,960

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1989, 3908071

Int. Cl.[5] **C21C** *7/02*

U.S. Cl. 75—312 **8 Claims**

1. An agent for desulphurizing molten metals consisting essentially of the following components: a CaC_2/CaO crystal blend containing 20 to 62% by weight CaC_2; coals containing 20 to 60% by weight of volatile constituents; and 1.5 to 44% by weight of metallic magnesium.

4,988,388

FREE-FLOWING GUAYULE RESIN AND BAGASSE MIXTURES AND THEIR USE AS FUEL OR SOIL AMENDENT

William W. Schloman, Jr., Stow, Ohio, assignor to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Mar. 3, 1989, Ser. No. 318,270

Int. Cl.[5] **C08L** *1/02;* **C05F** *5/00*

U.S. Cl. 106—200 **3 Claims**

1. A soil amendment comprising, a free flowing particulate composition of matter comprising solid particles of quayule bagasse impregnated with quayule resin wherein the composition comprises about 5 to about 35 parts by weight quayule resin per 100 parts by weight quayule bagasse and, effective amounts of adjuvants selected from the group consisting of fertilizers, polyisoprene molecular weight enhancers, pesticides, plant growth regulators, and mixtures thereof.

4,988,389

EXPLOITATION METHOD FOR RESERVOIRS CONTAINING HYDROGEN SULPHIDE

Ion-Ionel Adamache, 330-26 Avenue S.W., Apt. 302, Calgary, Alberta, Canada T2S 2T3 ; William L. Kennedy, 24 Stradbrooke Way S.W., Calgary, Alberta, Canada T3H 1S4 , and Michael C. Enwright, 32 Hawksley Crescent N.W., Calgary, Alberta, Canada T3G 3B9

Continuation-in-part of Ser. No. 248,191, Sep. 23, 1988, abandoned. This application Jun. 12, 1989, Ser. No. 364,474

Claims priority, application Canada, Oct. 2, 1987, 548468

Int. Cl.[5] E21B *43/00, 37/06*

U.S. Cl. 166—302 **34 Claims**

1. A method of substantially preventing deposition of sulphur from fluids containing hydrogen sulphide and sulphur on elements of a well, which penetrates a subterranean reservoir, during extraction of the reservoir fluids through the well, the well comprising:

an outer tubular casing;

first and second fluid pathways which are disposed within the outer casing;

an extraction interval comprising an opening in the outer casing for permitting entry of the reservoir fluids into the well;

an annular seal disposed within the outer casing above said extraction interval;

a jet pump disposed within said first fluid pathway and located above said annular seal;

a tailpipe in communication with said first fluid pathway and extending below said annular seal to said extraction interval at a depth below the point of entry of the reservoir fluids into the well;

a chemical injection tubing disposed within the outer casing and extending to a depth below said annular seal, at a depth below the point of entry of the reservoir fluids into the well, wherein the method comprises:

(i) injecting power fluid into said second fluid pathway;

(ii) injecting a sulphur solvent into said chemical injection tubing for circulating said injected sulphur solvent with the reservoir fluids;

(iii) driving said jet pump with said power fluid which enters said jet pump from said second fluid pathway and is commingled with and entrains the reservoir fluids to cause said commingled fluids to flow to the surface through said first fluid pathway;

whereby a pressurizing action of said jet pump retains sulphur in a dissolved, non-plugging state within said commingled fluids and a liquid film is formed on surfaces of said first fluid pathway which impedes and substantially prevents the deposition of sulphur upon the surfaces of said first fluid pathway.

4,988,390

METHOD FOR PRODUCTION OF INCLUSION WATER FOR HARDENING GYPSUM, METHOD FOR PRODUCTION OF SHAPED ARTICLE OF GYPSUM, AND SHAPED ARTICLE OF GYPSUM

Taiji Kambayashi, Yamatotakada; Hideyuki Mekata, Nara; Hiroyuki Kataoka, Matsubara, and Chuzo Kato, Tokyo, all of Japan, assignors to Osaka Yuki Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 17, 1990, Ser. No. 509,832

Claims priority, application Japan, Apr. 19, 1989, 1-97516

Int. Cl.[5] C04B *11/14*

U.S. Cl. 106—774 **3 Claims**

1. A shaped article of gypsum produced by obtaining an absorbent polymer by dissolving in an aliphatic hydrocarbon an acrylic copolymer using as components thereof (a) 40 to 95% by weight of a monomer, specifically an alkyl acrylate or an alkyl methacrylate, having an alkyl group of not less than 8 carbon atoms, (b) 5 to 40% by weight of a monomer, specifically at least one derivative selected from the group consisting of acrylic acid, methacrylic acid, acrylamide, and methacrylamide and containing at least one group selected from the class consisting of carboxyl group, amino group, quaternary ammonium group, and hydroxyl group, and (c) 0 to 40% by weight of an unsaturated monomer copolymerizable with the components (a) and (b) mentioned above, dispersing an aqueous solution of acrylic acid and an alkali metal salt thereof in the resultant solution, subjecting the resultant dispersion to reversed-phase suspension polymerization, cross-linking the resultant polymer with a cross-linking agent, and drying the cross-linked polymer, swelling said absorbent polymer thereby preparing an inclusion water for hardening gypsum, and mixing said inclusion water and hemihydrate gypsum or anhydrous gypsum each in the form of powder thereby causing the inclusion water to be released from the resultant mixture and allowed to harden the gypsum by hydration.

4,988,391

PROCESS, PLANT AND/OR APPARATUS FOR TREATING OIL-CONTAMINATED DEBRIS OR LIKE MATERIALS

Georg von Bormann, Gemsenstr. 22, D-4044 Kaarst, Fed. Rep. of Germany

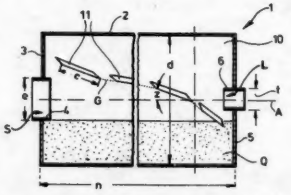
PCT No. PCT/DE84/00183, § 371 Date May 7, 1985, § 102(e) Date May 7, 1985, PCT Pub. No. WO85/01069, PCT Pub. Date Mar. 14, 1985

PCT Filed Sep. 6, 1984, Ser. No. 734,280

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1983, 8325846[U]; Jun. 18, 1984, 3422545

Int. Cl.[5] C73G *1/14;* B08B *3/08*

U.S. Cl. 134—25.5 **8 Claims**



1. A process for treating oil-contaminated debris comprising the steps of:

providing a drum rotatable about an axis, said drum being provided with a sidewall and opposed end walls, said opposed endwalls each having an inlet and said sidewall being provided with means for lifting the oil-contaminated debris being treated;

rotating said drum about said drum axis;

feeding said oil-contaminated debris through the inlet in one of said opposed endwalls;

feeding a lye washing solution having a pH of between 10 to 14 through the inlet in the other of said opposed endwalls such that said lye washing solution flows counter-current to the flow of said oil-contaminated debris and said debris is lifted by said means for lifting as said lye flows counter-current to said debris; and

passing said lye washing solution from said drum over a decanter wherein fines of said debris is separated from the lye.

4,988,392

COMPOSITE SHEET MADE OF MOLYBDENUM AND DISPERSION-STRENGTHENED COPPER

Richard D. Nicholson, 13101 Meadowood, Chardon, Ohio 44024, and Ronald S. Fusco, 7258 Grant St., Mentor, Ohio 44060

Division of Ser. No. 357,835, May 30, 1989. This application May 16, 1990, Ser. No. 525,168

Int. Cl.[5] B32B *15/02;* **B23K** *20/02, 20/04*

U.S. Cl. 148—11.5 Q **6 Claims**

1. The method for producing a composite sheet having alternating layers of dispersion-strengthened copper and of molybdenum which comprises preparing a composite billet by assembling plates of dispersion-strengthened copper and of molybdenum having substantially the same area in face-to-face relation, heating said assembled plates in an atmosphere essentially devoid of oxygen to a temperature within the hot rolling range for copper, pressing said assembled plates at a temperature between about 700° and 1000° C. to reduce the thickness thereof at least 40% so as to form a composite billet, said pressing being conducted in a protective atmosphere.

4,988,393

METHOD FOR PRODUCING HIGH-STRENGTH STEEL HAVING IMPROVED WELDABILITY

Ryota Yamaba; Yukio Tsuda; Atsuo Tanaka, and Keiichi Hattori, all of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 214,849, Jun. 30, 1988, abandoned, which is a continuation of Ser. No. 14,159, Feb. 12, 1987, abandoned, which is a continuation of Ser. No. 745,886, Jun. 18, 1985, abandoned. This application Dec. 12, 1989, Ser. No. 453,141

Claims priority, application Japan, Jun. 19, 1984, 59-124442; Jun. 19, 1987, 59-124443

Int. Cl.[5] C21D *8/00*

U.S. Cl. 148—12.4 **11 Claims**

1. A method for producing steel having a tensile strength of at least 80 kfg/mm^2, comprising: heating to a temperature of 1000° C. or higher, steel which consists essentially of as basic components, by weight percentage, from 0.04–0.11% of C, from 0.01–1.0% of Si, from 0.50–2.00% of Mn, from 0.10–1.0% of Mo, from 0.005–0.05% of Nb, from 0.0009–0.0012% of B, from 0.051–0.1% of Al, and 0.0060% or less of N, the balance being essentially Fe and unavoidable impurities thereby solid dissolving the solute Nb and Mo; rolling the heated steel at a finishing temperature of rolling of 800° C. or more, directly after rolling, rapidly cooling to a temperature of 200° C. or less; and then tempering to a temperature of AC_1 or less thereby precipitating the solid-dissolved Nb and Mo and improving the hardenability and weldability of the steel.

4,988,394

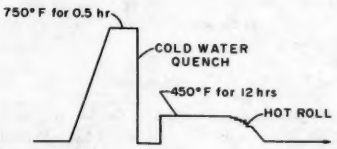
METHOD OF PRODUCING UNRECRYSTALLIZED THIN GAUGE ALUMINUM PRODUCTS BY HEAT TREATING AND FURTHER WORKING

Alex Cho, Richmond, Va., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 12, 1988, Ser. No. 256,521

Int. Cl.[5] C22F *1/04*

U.S. Cl. 148—12.7 A **76 Claims**



1. A method of producing an unrecrystallized, wrought aluminum base, heat treated product having improved levels of strength and fracture toughness, the method comprising the steps of:

(a) providing a body of an aluminum base, heat treatable alloy;

(b) hot working the body to a first wrought product;

(c) reheating said first wrought product;

(d) cooling said first wrought product;

(e) heat treating said first wrought product;

(f) further working said first wrought product to produce a second wrought product; and

(g) solution heat treating, quenching and aging said second wrought product to provide a substantially unrecrystallized product having improved levels of strength and fracture toughness.

4,988,395

WATER-SOLUBLE SOLDERING FLUX AND PASTE SOLDER USING THE FLUX

Toshihiko Taguchi, Saitama; Shozo Asano, Kashiwa; Ken'ichi Osawa, Ichikawa; Hiroo Nagai, and Hisao Ikeda, both of Funabashi, all of Japan, assignors to Senju Metal Industry Co., Ltd. and Nissan Chemical Industries Ltd., both of Tokyo, Japan

Filed Jan. 30, 1990, Ser. No. 472,522

Claims priority, application Japan, Jan. 31, 1989, 1-21801; Jun. 8, 1989, 1-144264; Jun. 15, 1989, 1-150653

Int. Cl.[5] B23K *34/35*

U.S. Cl. 148—24 **17 Claims**

1. A soldering flux which comprises, as a main fluxing agent, a resinous reaction product of at least one-carboxyl-containing compound having 8 or less carbon atoms, selected from the group consisting of monocarboxylic acids, polycarboxylic acids, and hydroxy-carboxylic acids with tris(2,3-epoxypropyl)-isocyanurate, and an activating agent.

4,988,396

CORROSION RESISTANT ALUMINUM COATING COMPOSITION

John W. Bibber, Batavia, Ill., assignor to Sanchem, Inc., Chicago, Ill.

Filed Apr. 26, 1989, Ser. No. 343,997

Int. Cl.[5] C23C *22/56*

U.S. Cl. 148—269 **5 Claims**

4. The process of claim 3 wherein the aluminum alloy is first coated with a solution containing 0.2–2.0% by weight aluminum nitrate and 0.2–2.0% by weight lithium nitrate, then coated with a solution containing 0.2 to 6.3% by weight alkali metal permanganate; and finally with a solution of alkali metal silicate.

4,988,397

ENERGETIC BINDERS FOR PLASTIC BONDED EXPLOSIVES

Horst G. Adolph; Judah Goldwasser, and G. William Lawrence, all of Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1986, Ser. No. 892,622
Int. Cl.[5] C06B *45/10*
U.S. Cl. 149—19.3 10 Claims

1. A binder composite comprising a mixture of

(1) a hydroxy-terminated fluoropolyformal prepolymer of the general formula

$$HOCH_2(CF_2)_nOCH_2OCH_2(CF_2)_mCH_2OH$$

wherein n is 3 or 4 and m is selected to provide a number average molecular weight of from about 1,000 to about 10,000 for the prepolymer; and

(2) an energetic plasticizer selected from the group consisting of

bis(2,2-dinitropropyl)formal,

bis(2,2,2-trinitroethyl)formal,

bis(2-fluoro-2,2-dinitroethyl)formal,

bis(2,2-difluoro-2-nitroethyl)formal,

2,2-dinitropropyl 2-fluoro-2,2-dinitroethyl formal, and mixtures thereof;

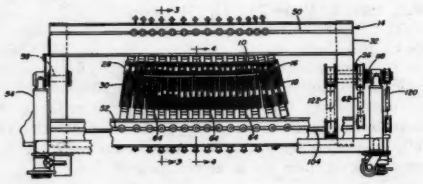
wherein the weight ratio of the energetic plasticizer to the hydroxy-terminated fluoropolyformal prepolymer is from about 2:1 to about 5:1.

4,988,398

LAMINATE PREPRESS ROLL ASSEMBLY

Gordon F. Pereman, and John D. Kellar, both of Ontario, Canada, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 26, 1989, Ser. No. 456,710
Int. Cl.[5] B32B *31/14*
U.S. Cl. 156—064 14 Claims



12. In an method of pressing together superimposed sheets to form a laminate, including the steps of positioning a leading edge of said laminate between pairs of upper and lower, aligned roll segments, rotating selected ones of said roll segments to convey said laminate between said roll segments in a given direction, and biasing said pairs of segments toward each other whereby said roll segments apply pressure to opposing major surfaces of said laminate, the improvement comprising:

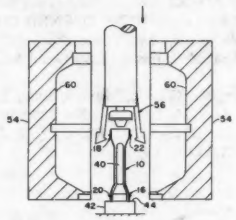
adjusting the position of said selected roll segment independent from movement of said other roll segments in response to the position of a leading edge of said laminate to align said selected roll with said leading edge of said laminate while continuing to rotate said selected roll segment to convey said laminate between said upper and lower roll segments.

4,988,399

PROCESS FOR MAKING A THREE-PIECE CONTAINER INVOLVING STRETCH-BLOW MOLDING, SEVERING AND ATTACHING AN END PANEL TO THE OPEN BOTTOM

Martin J. Watson, Murrysville, and Thomas L. Levendusky, Greensburg, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jul. 5, 1989, Ser. No. 375,528
Int. Cl.[5] B29C *49/04, 49/10, 49/64*
U.S. Cl. 156—73.5 38 Claims



1. A method of producing a pair of container bodies comprising the steps of:

providing a generally cylindrical, hollow preform of a thermoplastic polymer material having a cylindrical body comprising a sidewall and an open neck finish on first and second opposed longitudinal ends thereof,

heating the preform having finished neck portions to a temperature above the polymer glass transition temperature and below the polymer melting temperature wherein during the heating of the preform the neck finish on both ends of the preform is shielded from at least a portion of the heating to minimize the heating of the neck finish portions and thus avoid softening and distortion of the neck finish portions.

stretching the heated preform longitudinally by applying force to at least one of the ends in such a manner that the neck finish portions are not subject to appreciable longitudinal stretching,

sealing both open neck finish portions, then stretching the heated preform transversely by introducing fluid pressure therein sufficient to form a stretch blown component having a first neck at one end thereof, a second neck at the other longitudinal end thereof, and a body portion between the necks, and

separating one end portion of the stretch blown component from the other end portion of the stretch blown component by severing the stretch blown component transversely through the body portion to provide two container bodies, each container body having a neck finish corresponding dimensionally with the respective neck finish on the preform from which the container bodies are stretch-blown and an open end spaced longitudinally from said neck.

4,988,400

METHOD AND APPARATUS FOR TREATING THE SURFACE OF AN INSULATING STRIP

John R. Rundo, Strongsville, Ohio, assignor to Tremco Incorporated, Cleveland, Ohio

Filed Oct. 4, 1989, Ser. No. 417,707
Int. Cl.[5] B32B *31/18*
U.S. Cl. 156—247 31 Claims

1. An apparatus for texturing the surface of an insulating strip, comprising:

a roller having a textured surface;

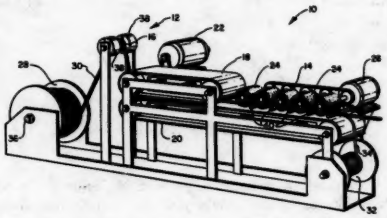
means for guiding a surface of the insulating strip into contact with the textured surface of the roller; and

a pin mounted adjacent the roller for separating the insulating strip from the roller.

21. A method for texturing the surface of an insulating sealant strip with a texturing roller, comprising the steps of:

providing a supply of insulating sealant strip from a source;

directing the insulating sealant strip to the texturing roller;



placing the insulating sealant strip in tangential adherent contact with the texturing roller such that the surface of the insulating sealant strip is imprinted by the texturing roller; and

removing from the roller any portion of insulating sealant strip which remains adhered to the roller.

4,988,401

PROCESS FOR STICKING RUBBER TO ALUMINUM

Catherine Rebreyend, Egreve, France, assignor to Cegedur Pechiney Rhenalu, Paris, France

Filed Jun. 6, 1989, Ser. No. 362,108

Claims priority, application France, Jun. 15, 1988, 88 08476

Int. Cl.[5] C09J *5/02*

U.S. Cl. 156—326 **9 Claims**

1. A process for adhering rubber to an aluminum surface, comprising the steps of:

anodizing the surface of the aluminum which is to be adhered to the rubber;

treating said anodized surface with a solution consisting essentially of a silane mercaptan in an organic solvent;

causing substantially total evaporation of said organic solvent; and

subsequently, depositing said rubber directly on said silane mercaptan treated surface and maintaining at a temperature of about 200°–250° C. for at least two minutes without application of pressure to adhere said rubber to said aluminum surface.

4,988,402

PROCESSES FOR ENHANCING FLUORESCENCE OF TUNABLE TITANIUM-DOPED OXIDE LASER CRYSTALS

Milan R. Kokta, Washougal, Wash., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation-in-part of Ser. No. 154,033, Feb. 9, 1988, Pat. No. 4,836,953. This application Dec. 21, 1988, Ser. No. 287,011

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] C30B *15/00*

U.S. Cl. 156—605 **8 Claims**

1. A method for enhancing a titanium doped oxide crystal suitable as a laser material comprising maintaining the crystal at a temperature of about 50° C. to about 80° C. below the melting point of the crystal in an inert atmosphere containing hydrogen in an amount of at least about 20 volume percent for a time sufficient to enhance the Figure of Merit of the crystal by at least 10 percent.

4,988,403

METHOD OF FORMING PATTERNED SILICONE RUBBER LAYER

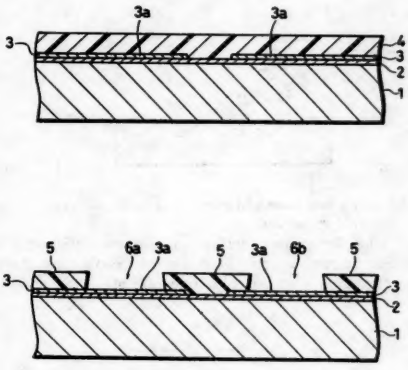
Kozo Matuo, Kyoto, Japan, assignor to Rohm Co., Ltd., Kyoto, Japan

Filed Dec. 19, 1989, Ser. No. 452,360

Claims priority, application Japan, Dec. 21, 1988, 63-324492

Int. Cl.[5] H01L *21/308, 21/31*

U.S. Cl. 156—643 **9 Claims**



1. A method of forming a patterned silicone rubber layer comprising the sequential steps of:

forming a polyimide layer on a surface of a workpiece,

etching said polyimide layer in a predetermined pattern;

forming a silicone rubber layer on said workpiece surface over said patterned polyimide layer and said workpiece by spin coating,

etching said silicone rubber layer by plasma etching until said patterned polyimide layer is exposed, and

etching said patterned polyimide layer by contacting said polyimide with a hydrazine containing etching liquid until said polyimide layer is completely removed, said hydrazine concentration being effective for etching polyimide to thereby provide a pattern formed of said silicone rubber layer on said workpiece.

4,988,404

METHOD OF PRODUCING A PRIMARY DIFFRACTION GRATING

Toshitaka Aoyagi, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 16, 1989, Ser. No. 421,773

Claims priority, application Japan, Oct. 17, 1988, 63-261872

Int. Cl.[5] B44C *1/22;* C03C *15/00, 25/06*

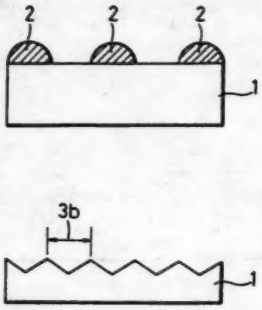
U.S. Cl. 156—651 **2 Claims**

1. A method of producing a primary diffraction grating comprising:

forming a resist pattern for producing a second diffraction grating on a substrate;

etching said substrate using said resist pattern as a mask, thereby producing a secondary diffraction grating;

depositing a second mask material on said substrate and on the resist remaining on said substrate;



removing said resist and the second mask material that overlies said resist; and

etching the exposed surface of said substrate using said second mask material on said substrate as a mask, thereby producing a primary diffraction grating.

4,988,405

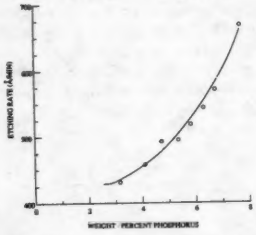
FABRICATION OF DEVICES UTILIZING A WET ETCHBACK PROCEDURE

Edward P. Martin, Jr., Bethlehem, Pa.; Ronald J. Schutz, Warren, and Gerald Smolinsky, Madison, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 21, 1989, Ser. No. 454,088

Int. Cl.[5] H01L *21/265*

U.S. Cl. 156—657 **6 Claims**



1. A process for fabricating an integrated circuit comprising the steps of fabricating device structures on a substrate to yield a nonplanar substrate surface, forming a region of smoothing material on said substrate surface, removing essentially all of said smoothing material and continuing the fabrication of said device characterized in that said removal is accomplished by wet etching wherein the wet etching removal rate of said smoothing material does not differ from the removal rate of said substrate by more than 20 % whereby said nonplanar substrate by more than 20% whereby said nonplanar substrate surface after said procedure is smoothed such that 90% of said surface of said substrate makes an angle of less than 10° relative to an imaginary plane parallel to said surface before processing of said device.

4,988,406

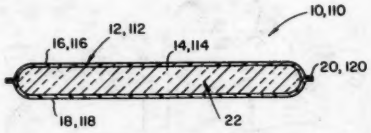
INSULATION DEVICE AND METHOD OF MAKING SAME

Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.

Continuation-in-part of Ser. No. 931,150, Nov. 17, 1986, abandoned. This application Jan. 24, 1989, Ser. No. 302,101

Int. Cl.[5] B32B *31/16*

U.S. Cl. 156—73.6 **17 Claims**



1. A method of making a preformed insulation module which is fabricated separately prior to installation into the apparatus to be insulated, said method comprising the steps of:

fabricating an enclosure which defines an interior cavity out of a fluid impermeable, pliable material with a peripheral configuration and contoured thickness dictated by the configuration of the apparatus to be insulated;

forming an opening into the cavity of the enclosure;

injecting loose, discrete divided insulation material through the opening of the enclosure into the cavity of the enclosure so as to fill said cavity in order to support and maintain the peripheral configuration and contoured thickness of said enclosure;

concurrently with injecting the insulation material into the cavity, applying an uncured binder on the insulation material as it is being injected into the cavity to homogeneously distribute the uncured binder throughout the insulation material being injected into the enclosure cavity; and,

closing the opening of the enclosure.

4,988,407

PROCESS AND APPARATUS FOR PRODUCING DRY BLACK LIQUOR SOLIDS

Donald I. Parker, Rte. 1, Box 211A, Linwood, N.C. 27299

Filed Nov. 30, 1989, Ser. No. 443,590

Int. Cl.[5] D21C *11/12*

U.S. Cl. 162—30.11 **8 Claims**

1. In a process for producing dry black liquor solids the improvement comprising the steps of:

supplying a first stream of black liquor having a solids content in a range such that the first stream flows as a viscous liquid,

supplying a second stream of black liquor solids having a solids content in a range such that the second stream flows as a friable granular dry solid,

mixing the first and second streams so as to produce an output stream having a solids content such that the output stream flows as a dry solid,

drying the output stream of black liquor solids and raising the solids content to a range such that the output stream flows as a friable granular dry solid, and

returning a portion of the dried output stream of black liquor solids to said second stream of black liquor solids.

4,988,408

APPARATUS FOR GUIDING WIRES OF A DOUBLE WIRE FORMER

Osmo Eväilahti, Karhula, Finland, assignor to Valmet-Ahlstrom Inc., Karhula, Finland

Filed Nov. 15, 1989, Ser. No. 436,772

Claims priority, application Finland, Dec. 1, 1988, 885607

Int. Cl.[5] D21F *1/36*

U.S. Cl. 162—301 **11 Claims**

1. A double wire section in the paper machine former comprising:

a dewatering unit which drains water from the stock flowing between top and bottom wires moving in parallel, said top wire being adjacent to said dewatering unit;

foil lists adjacent to said bottom wire for biasing said bottom wire against said top wire; an elongated load hose divided longitudinally into separate pressure spaces, comprising means for maintaining a desired pressure on said wire and indirectly on said stock by biasing said foil lists against said bottom wire;

said load hose comprising an elongated in a direction of elongation outer hose having a uniform pressure space and an inner surface, and a single inner hose extending longitudinally within said outer hose in the same direction of elongation and divided into said pressure spaces and having top and bottom outer surfaces and two sides in horizontal direction; said top and bottom outer surfaces of said inner hose being adjacent to and touching the inner surface of said outer hose such that said inner hose fills the outer hose in vertical direction, and said inner hose being smaller in the horizontal direction than said outer hose and defining said uniform pressure space between the inner hose and the outer hose at both sides of the inner hose in the horizontal direction.

4,988,409

PRESS FELT WITH ASYMETRIC FIBER CROSSSECTION IN A SURFACE LAYER OF LOWEST PERMEABILITY

Esko Nyberg, Tampere, Finland, assignor to Tamfelt Oy Ab, Tampere, Finland

Filed May 31, 1989, Ser. No. 359,311

Claims priority, application Finland, Jun. 8, 1988, 882721

Int. Cl.[5] D21F *7/08*

U.S. Cl. 162—358 **7 Claims**

1. A press felt, for transporting a fiber web through the press section of a paper machine and for removing water from the fiber web, comprising:

at least one fabric layer;

a first surface layer of the felt, said first surface layer comprising a first fiber, disposed on said at least one fabric layer on a side adjacent the fiber web; and

a second surface layer of the felt, said second surface layer comprising a second fiber, disposed at a side of said at least one fabric layer to be facing away from the web;

the air permeability of both said first and second surface layers being substantially smaller than that of all fabric layers in said press felt and the air permeability of said second surface layer being substantially smaller than the air permeability of said first surface layer adjacent the web, the second fiber being asymmetric in cross-section.

4,988,410

PRESS SECTION WITH TWO EXTENDED NIP PRESSES FOR THE PRODUCTION OF A FIBROUS WEB

Albrecht Meinecke, Heidenheim, and Karl Steiner, Herbrechtingen, both of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Fed. Rep. of Germany

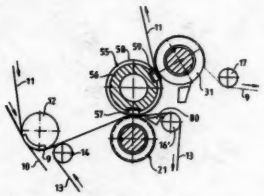
Filed May 5, 1989, Ser. No. 347,762

Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815278

The portion of the term of this patent subsequent to May 8, 2007, has been disclaimed.

Int. Cl.[5] D21F *3/04*

U.S. Cl. 162—360.1 **10 Claims**



1. A press section of a paper making machine for dewatering a fibrous paper web, comprising:

two extended press nips disposed one behind the other in the direction of travel of the web;

the two extended press nips being formed by two respective press rolls and by a single flexible rotating press member, and two respective press shoes structured and arranged for pressing the rotating press member against the corresponding press rolls;

means for guiding said flexible press member to rotate over a substantially cylindrical path;

first and second endless felt belts which guide the paper web to be dewatered into the first extended press nip, the paper web being sandwiched between the two felt belts, said first felt belt being sandwiched between the paper web and the flexible rotating press member, and said second felt belt being sandwiched between the paper web and the first press roll;

wherein only said first endless felt belt guides the paper web to be dewatered into the second extended press nip;

wherein the single flexible press member has a rough outer surface; and

wherein the press roll of the second extended press nip has a smooth, non-water-absorbent surface; and

further comprising means for supplying lubricant to said two press shoes within said flexible rotating press member; and the flexible press member being constructed as an inflatable press jacket closed at the ends; thereby preventing any of said lubricant from escaping from within said press member.

4,988,411

FILLING CAR FOR A COKE OVEN BATTERY

Horst Schröter, Viersen, Fed. Rep. of Germany, assignor to Harting, Kuhn & Co. Naschinenfabrik GmbH, Essen, Fed. Rep. of Germany

Filed May 21, 1990, Ser. No. 527,113

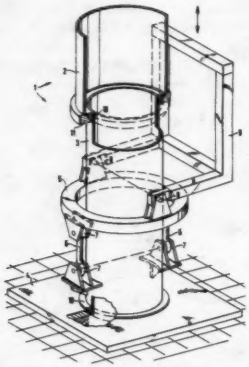
Claims priority, application Fed. Rep. of Germany, May 26, 1989, 3917116

Int. Cl.[5] C10B *31/02*

U.S. Cl. 202—251 **1 Claim**

1. A filling car for filling coal in oven chambers of a coke oven battery, comprising a telescopable filling pipe having an upper part and a lower part and a lower end to be lowerable to a filling frame of a filling opening of a coke oven battery; a supporting ring in which said lower part of said filling pipe is supported for turning about a horizontal axis; a liftable and lowerable supporting bracket in which said supporting ring is

held; means for suspending said lower part of said filling pipe in said supporting ring and including two oppositely located hinge arms; and means for holding said supporting ring on said supporting bracket and including two oppositely located pivot



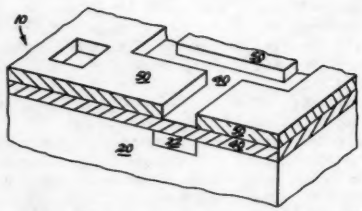
pins arranged so that said supporting ring is turnable about a horizontal axis relative to said supporting bracket, said hinge arms and said pivot pins being offset relative to one another by 90°.

4,988,412

SELECTIVE ELECTROLYTIC DESPOSITION ON CONDUCTIVE AND NON-CONDUCTIVE SUBSTRATES

Yung S. Liu, Schenectady; Herbert S. Cole, Scotia; Renato Guida, Wynantskill, and James W. Rose, Delmar, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1988, Ser. No. 289,944
Int. Cl.[5] C25D *5/02*
U.S. Cl. 204—15 **9 Claims**



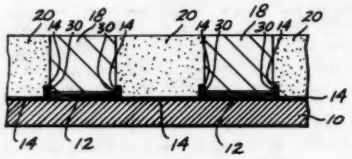
1. A method of electroplating in accordance with a desired plating pattern, said method comprising the steps of:
   (a) providing a body having a surface which is conductive, said body comprising:
      a substrate, and
      a substantially continuous conductive structure disposed over said substrate, said conductive structure comprising first and second different conductive materials, both of which are exposed at said conductive surface of said body, said first conductive material being exposed in said desired plating pattern and said second conductive material having a native dielectric film formed thereon;
   (b) coupling an electrode to said conductive structure;
   (c) applying a plating polarity of power to said electrode; and, after step (c)
   (d) immersing at least the portion of said body to be plated in an electroplating bath for a time sufficient to form a desired thickness of electroplated material on said first conductive material without electroplating on said second conductive material.

4,988,413

REDUCING PLATING ANOMALIES IN ELECTROPLATED FINE GEOMETRY CONDUCTIVE FEATURES

Kishore K. Chakravorty, Issaquah, and Lane S. Lathrop, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 17, 1989, Ser. No. 312,890
Int. Cl.[5] C25D *5/02*
U.S. Cl. 204—15 **28 Claims**



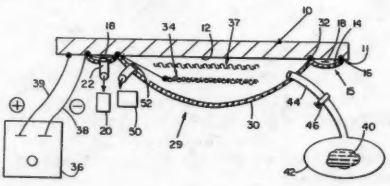
1. A method for reducing the formation of distortions in a conductive feature to be electroplated onto a surface of a seed layer, the method comprising the steps of:
   (a) plasma etching said surface of said seed layer to remove adhesion promoting composition applied to said surface of said seed layer;
   (b) removing at least several monolayers of said seed layer from said surface; and
   (c) electroplating said conductive feature onto said surface.

4,988,414

IN-SITU SURFACE TREATMENT CONTAINMENT APPARATUS AND METHOD

Everett A. Westerman, Jr., King County, Wash., assignor to The Boeing Company, Seattle, Wash.

Division of Ser. No. 189,423, May 2, 1988, now U.S. Patent No. 4,882,016. This application Sept. 8, 1989, Ser. No. 404,645
Int. Cl.[5] C25D *5/02, 17/00*
U.S. Cl. 204—15 **30 Claims**



1. An apparatus for containing a treating fluid while treating a surface in-situ, comprising:
   an airtight treating chamber formed with a flexible treating membrane sealed to said surface;
   a retaining chamber formed with a flexible retaining membrane attached around at least a portion of a periphery of said treating chamber for retaining said treating chamber in position on said surface;
   a retaining vacuum source coupled to said retaining chamber;
   a treating vacuum source coupled to said treating chamber;
   a conductive screen within said treating chamber coupled to a voltage potential;
   a voltage potential coupled to said surface;
   an insulating member within said treating chamber disposed between said screen and said surface; and
   a fluid source coupled to said treating chamber for providing a fluid into said treating chamber when a vacuum is applied from said vacuum source to said treating chamber.

4,988,415

METHOD OF PRODUCING AN ANTI-WEAR COATING INCLUDING A CHROMIUM LAYER ON A SURFACE OF A STRUCTURAL PART OF TITANIUM OR TITANIUM-BASED ALLOY

Thoma Martin, Munich, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen GmbH, Postfach, Fed. Rep. of Germany

Continuation of Ser. No. 195,494, May 18, 1988, abandoned. This application Dec. 24, 1989, Ser. No. 462,306

Claims priority, application Fed. Rep. of Germany, May 20, 1987, 3716937

Int. Cl.[5] C23C *28/02*

U.S. Cl. 204—37.1 **7 Claims**

1. In a method of producing an anti-wear layer on a surface of a structural part of titanium or a titanium alloy including the steps of chemically depositing an adherent layer of nickel on a surface of a structural part of titanium or a titanium alloy, heat treating at a temperature of at least 450° C. the thus coated part to produce diffusion layers of $TiNi_3$ and Ti_2Ni between the nickel layer and the titanium part and removing any nickel still present, the improvement comprising galvanically depositing a layer of chromium from a galvanic bath containing CrO_3 onto one of said diffusion layers.

4,988,416

PROCESS FOR THE ELECTROSYNTHESIS OF ALDEHYDES

Michel Troupel, Maincy; Soline Sibille, Saint-Maur des Fosses; Jacques Perichon, Savigny sur Orge; Esther D'Incan, Chatenay-Malabry, and Christhophe Sabourеau, Brie-Comte - Robert, all of France, assignors to Societe Nationale des Poudres et Explosifs, Paris, France

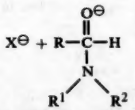
Filed Nov. 17, 1989, Ser. No. 437,820

Claims priority, application France, Nov. 23, 1988, 88 15235

Int. Cl.[5] C25B *3/00*

U.S. Cl. 204—59 R **20 Claims**

1. Process for the electrosynthesis of an aldehyde by the electrolysis, in an electrolytic cell fitted with electrodes, of a reaction mixture comprising an organic halide and an N,N-disubstituted formamide, to form a product after electrolysis having the formula:



wherein R represents an organic radical; X represents a halogen atom; R^1 and R^2 which are identical or different, represent a substituted or unsubstituted aliphatic or aromatic chain, or R^1 and R^2 form a ring, followed by the hydrolysis of said electrolysis product, comprising utilizing an electrolytic cell having a single compartment and a sacrificial anode made of a metal selected from the group consisting of the reducing metals and their alloys.

4,988,417

PRODUCTION OF LITHIUM BY DIRECT ELECTROLYSIS OF LITHIUM CARBONATE

David H. DeYoung, Export, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 29, 1988, Ser. No. 291,527

Int. Cl.[5] C25C *3/02, 7/00, 7/04*

U.S. Cl. 204—68 **24 Claims**

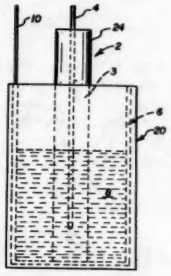
1. A method of electrolytically producing lithium comprising

providing an electrolytic cell having an anode compartment and a cathode compartment, each containing fused salt electrolytes,

separating said compartments with a porous electrically nonconductive membrane which will be wetted by said electrolytes and permit migration of lithium ions therethrough,

introducing lithium carbonate into said anode compartment and dissolving said lithium carbonate in the electrolyte contained in said anode compartment,

electrolyzing said lithium carbonate,



delivering lithium ions from said anode compartment to said cathode compartment,

during said delivery of said lithium ions resisting diffusion of carbonate ions across said membrane from said anode compartment to said cathode compartment, and

converting said lithium ions into lithium metal.

4,988,418

METHOD OF ELECTRICALLY MEASURING THE CONCENTRATION OF ACIDS

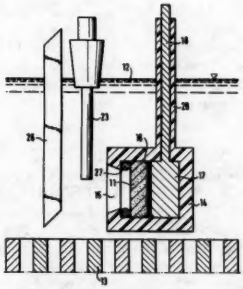
Fritz Beck, Duisburg; Holger Krohn, Müilheim; Rainer Wagner, Dortmund, and Eberhard Nann, Soest-Deiringsen, all of Fed. Rep. of Germany, assignors to Hagen Batterie AG, Soest, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,534

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809247

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—153.1 **20 Claims**



1. Method of electrically measuring a concentration of an acid wherein a concentration dependent electrochemical potential of a measurement electrode arranged in the acid and cooperating with an inert counterelectrode, which is likewise arranged in the acid, is measured relative to a suitable reference electrode and the concentration is derived therefrom, characterised in that a measurement electrode (11) comprising crystalline graphite is arranged in an acid (12) with intercalatable anions; in that the measurement electrode is intercalated; in that an anodic current of a suitable size is directed through the measurement electrode; in that the current is maintained until a graphite intercalation compound has formed at the surface of the measurement electrode; in that the potential of the mea-

surement electrode which arises at the start of the formation of the graphite intercalation compound is measured and used as a measure for the acid concentration; and in that, before the formation of the graphite intercalation compound arises which goes substantially beyond the surface, the current is reversed or a negative potential is applied to the measurement electrode of a size such that the measurement electrode is deintercalated again.

4,988,419

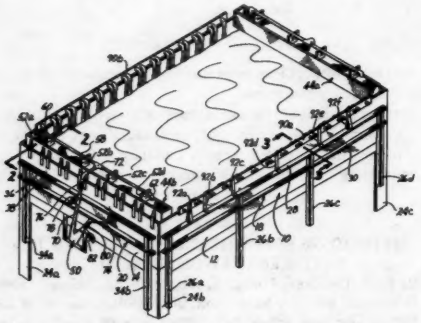
METHOD AND APPARATUS FOR PRODUCING CONDUCTIVITY IN MATERIALS

Jack Rooklyn, Northridge, Calif., assignor to Industrial Management Co., North Hollywood, Calif.

Filed Jan. 20, 1988, Ser. No. 146,089

Int. Cl.[5] B29C *71/04*

U.S. Cl. 204—157.42 **32 Claims**



1. A method of making materials electrically conductive or increasing the electrical conductivity of materials comprising, in combination:

preparing a bath of liquid having dissolved in it ingredients making the liquid electrically conductive;

immersing the material to be treated in the said liquid bath;

causing an alternating electric current to pass through the said liquid bath and the material and simultaneously subjecting the said liquid bath and the material to ultrasonic vibrations whereby the molecular structure of the said material is loosened to cause the current to carry the said ingredients into and through the material to be treated, whereby the material is made electrically conductive or its electrical conductivity is increased.

4,988,420

ELECTROPHORECTICALLY OVERCAOTABLE COATINGS APPLIED BY ELECTROCOATING

Wolfgang Batzill; Ulrich Heilmann; Hans J. Streitberger, all of Münster; Harald Guder, Wuppertal, and Fritz Beck, Duisburg, all of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Münster, Fed. Rep. of Germany

Division of Ser. No. 72,269, Aug. 17, 1987, Pat. No. 4,882,090.

This application Sep. 15, 1989, Ser. No. 407,875

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1985, 3538792

Int. Cl.[5] B05D *7/14*; C25D *13/06*

U.S. Cl. 204—181.1 **2 Claims**

1. A process for preparing a multibuild coating comprising:

electrophoretically applying to an electrically conductive substrate a basecoat aqueous electropaint which contains a cationic amine-modified epoxy resin formed from (a) a polyepoxide, and (b) a primary or secondary amine or a salt thereof, or a tertiary amine salt, said basecoat being pigmented with an electroconductive carbon black in an amount ranging from 1.5 to 5.1% by weight based on the total solids and having an iodine absorption of 870–930 mg/g, a specific surface area (BET/N_2) of 850–1000 m^2/g, a pore volume (DEP) of 330–390 ml/1000 g and an average particle size of 25 to 35 nm;

crosslinking the basecoat, and

electrophoretically overcoating the crosslinked basecoat to form the multibuild coating.

4,988,421

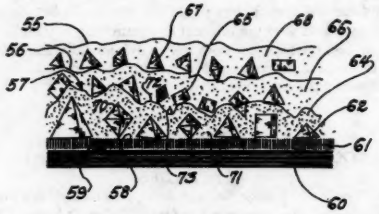
METHOD OF TOUGHENING DIAMOND COATED TOOLS

William R. Drawl, State College, Pa., and Robert C. McCune, Birmingham, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 12, 1989, Ser. No. 296,469

Int. Cl.[5] C23C *14/34, 16/26*

U.S. Cl. 204—192.3 **22 Claims**



1. Method of toughening the structure of a diamond or diamond-like coated tool, comprising:

(a) depositing, by low pressure CVD, a plurality of layers of separated diamond or diamond-like particles onto a non-diamond or nondiamond-like tool substrate, the substrate being selected to facilitate diamond or diamond-like deposition and to retain its strength related properties after such CVD; and

(b) interposing by PVD a mechanically adherent, planarized binding material between and on said layers of particles and across the separated particles of each particle layer, coupled with negative bias sputtering of said substrate, said binding material being substantially devoid of diamond graphitizing or dissolution agents.

4,988,422

PROCESS AND APPARATUS FOR DEPOSITING COATINGS OF HIGH ELECTRICAL RESISTANCE BY CATHODE SPUTTERING

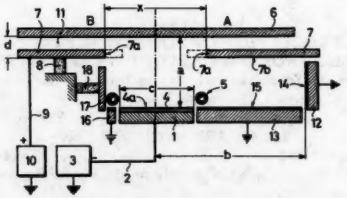
Peter Wirz, Waldernbach, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jun. 8, 1987, Ser. No. 59,067

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1987, 3709175

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.15 **23 Claims**



1. Process for sputtering electrically resistive coatings onto substantially planar substrates by cathode sputtering by means of a magnetron cathode supplied with direct current, in a vacuum and in a reactive atmosphere with the continuous delivery of reaction gas, said cathode including a target having

a planar target surface, the substrates being held or carried plane-parallel to the target surface, a masking system being situated between the planes of the target surface and the substrate and having a potential that is either positive with respect to the cathode potential or is self-establishing, comprising the steps of:

(a) delivering the reaction gas as close as possible to the target surface, but outside of its outline as seen in plan view,

(b) maintaining the distance "a" between target surface and substrate surface at less than 60 mm, and,

(c) selecting a distance "d" between the substrate and the surface of the mask system facing the target that is smaller than half of the distance "a", whereby,

the reaction gas and the target, and the target and the substrate, respectively, are to a large extent coupled.

12. Apparatus for sputtering electrically resistive coatings onto substantially planar substrates by cathode sputtering, said apparatus having a vacuum chamber, a magnetron cathode supplied with direct current and bearing a planar target surface, a substrate holding or guiding means adapted to hold and carry a substrate plane-parallel to the target surface, a mask disposed between the planes of the target surface and the substrate and provided with a predeterminable or floating potential, and a reaction gas feeding and distributing system having outlets for continuous delivery of reaction gas wherein:

(a) the outlets of the distributing system for the reaction gas are disposed as close as possible to the target surface but outside of the its outline, seen in plan view,

(b) the distance "a" between target surface and substrate surface is less than 60 mm, and

(c) the distance "d" between the substrate and the surface of the mask facing the target is less than half of the distance "a", whereby,

the reaction gas and the target, and the target and the substrate, respectively, are to a large extent coupled.

4,988,423

METHOD FOR FABRICATING INTERCONNECTION STRUCTURE

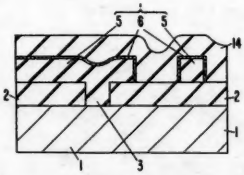
Hiroshi Yamamoto, Neyagawa; Tsutomu Fujita, Hirakata; Takao Kakiuchi, Takarazuka; Kousaku Yano, Osaka; Shuichi Tanimura, and Shinji Fujii, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 176,771, Apr. 1, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 430,950

Claims priority, application Japan, Jun. 19, 1987, 62-153662; Oct. 20, 1987, 62-264433

Int. Cl.[5] C23C *14/34;* H01L *21/285*

U.S. Cl. 204—192.17 **8 Claims**



4. A method of fabricating an interconnection structure which has an osmosis preventing passivation film and a metal conductor line, said metal conductor line having a low rate of disconnection failure caused by mechanical stress applied by said osmosis preventing passivation film, comprising:

forming a contact hole in a dielectric film on a substrate;

depositing an Al film or Al alloy film or a layered metal film thereof with another metal film on said dielectric film by a sputtering method improved in step coverage by applying at least one of bias potential and heat energy to said substrate, at least for a certain time during deposition;

processing said Al film or Al alloy film or layered metal film thereof with another metal film into a metal line;

fabricating a metal conductor line by depositing a film of high melting point metal or alloy thereof on the top and side surfaces of said metal line; and

forming on said metal conductor line an osmosis preventing passivation film comprising silicon nitride,

wherein at least a part of said metal conductor line has a width of no greater than 1 μm.

4,988,424

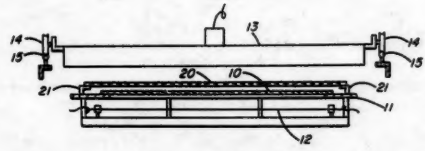
MASK AND METHOD FOR MAKING GRADIENT SPUTTERED COATINGS

Danny L. Woodward, Huntsville, Ala., and Chester Thrasher, Elora, Tenn., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 7, 1989, Ser. No. 362,645

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.29 **13 Claims**



10. A method of sputter coating a substrate with a coating having gradations in thickness wherein a coating is sputtered from a target electrode onto the substrate which is of substantially larger area than the target electrode, reciprocating relative motion is provided between the substrate and the target electrode during sputtering, and the deposition of the coating onto at least a portion of the substrate is partially masked by means of a foraminous mask having a large number of apertures interposed between the electrode and said at least portion of the substrate and spaced therefrom a sufficient distance to produce gradations in the coating thickness.

4,988,425

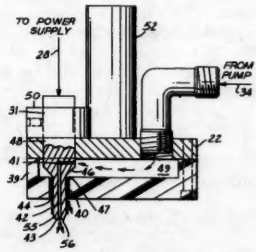
ELECTRODE WITH BOTH OUTSIDE AND INSIDE FLOW OF ELECTROLYTE FOR ELECTROCHEMICAL MACHINING

Lawrence Everhart, Utica, Mich., assignor to Technology Tool Company, St. Clair Shores, Mich.

Filed Nov. 20, 1989, Ser. No. 439,910

Int. Cl.[5] B23H *9/14, 3/04*

U.S. Cl. 204—224 M **15 Claims**



1. An apparatus for electrochemical machining, comprising:

a power supply;

an electrode holder containing an electrode having a central fluid passage;

said power supply being connected to said electrode and a workpiece and passing a current therebetween;

an electrolyte reservoir containing an electrochemical machining electrolyte;

means for directing the electrochemical machining electrolyte from said electrolyte reservoir to said electrode holder;

a manifold in said electrode holder such that the electrochemical machining electrolyte is directed from said manifold to a gap located between said electrode and a workpiece through both said central fluid passage and around the outer periphery of said electrode to ensure adequate supply and uniform distribution of the electrochemical machining electrolyte; and

said electrode has a passage section of a first diameter and an enlarged section of a second diameter larger than said first diameter, said enlarged section being mounted within said electrode holder, said electrode holder having an opening for passage of said passage section and defining a stop, said opening being of a third diameter smaller than said second diameter such that said opening prevents passage of said enlarged section outwardly of said opening.

4,988,426

HOLDING APPARATUS FOR ARTICLES TO BE ELECTROPLATED

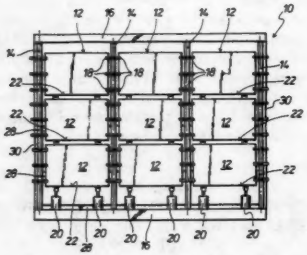
Hans J. Metzka, Nuremberg, Fed. Rep. of Germany, assignor to Metzka GmbH, Schwanstetten, Fed. Rep. of Germany

Filed Jun. 11, 1990, Ser. No. 535,964

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1989, 8910413[U]

Int. Cl.[5] C25D *17/08*

U.S. Cl. 204—297 R **7 Claims**



1. A holding apparatus for articles to be electroplated, comprising upstanding bar elements, contact members on the bar elements for contacting of the articles to be electroplated which are supplied from the front size of the holding apparatus, columns disposed at the rear side of the apparatus at a spacing, elongate transverse elements disposed on said columns and adapted to be displaced therealong and arrested thereon, and support devices on the transverse elements, with support members for supporting the articles, wherein the support members for supporting the articles are adapted to be arranged in the plane in which adjacent bar elements extend.

4,988,427

LIQUID/SOLID SEPARATION UNIT

William E. Wright, 1201 W. Thornton Pkwy. #10, Thornton, Colo. 80221

Filed Apr. 30, 1990, Ser. No. 516,527

Int. Cl.[5] B01D *17/06*

U.S. Cl. 204—304 **16 Claims**

1. A system for the separation of working fluids comprising:

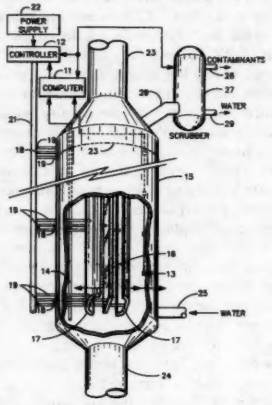
a container for working fluid(s);

movable electrode means and movable ground electrode means, positioned within the container means, for providing, on application of predetermined alternating current, electric power,

(a) a predetermined electrical flux field within a predetermined volume of working fluid within the container, and

(b) convection current agitation within the predetermined volume of working fluid;

sensor means for sensing at least one of (a) the position(s) of electrode means and ground electrode means within the



container, (b) the volume of a working fluid within the container, (c) the temperature of a working fluid, (d) the electrical flux field size; and (e) electrical flux field density;

controller means foar regulating, during the application of predetermined alternating current electrical power, at least one of electrode and ground electrode position(s), flux field size, flux field density, working fluid volume, working fluid temperature; and means for positioning at least one of the electrode and the ground electrode means.

4,988,428

NOX CONCENTRATION MEASURING APPARATUS

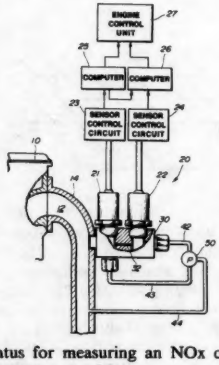
Yasunori Iwakiri, and Akinobu Moriyama, both of Yokohama, Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed May 15, 1990, Ser. No. 523,459

Claims priority, application Japan, Jun. 1, 1989, 1-140016

Int. Cl.[5] G01N *27/407*

U.S. Cl. 204—406 **3 Claims**



1. An apparatus for measuring an NOx concentration of gases to be measured, comprising:

a first sensor sensitive to oxides of nitrogen for resolving oxides of nitrogen at low oxygen partial pressures, the first sensor including an electrochemical cell containing an oxygen ion conductive electrolyte layer having at least two electrodes disposed on the opposite surfaces thereof for producing a first sensor signal indicative of an oxygen partial pressure of the gases introduced into the electrochemical cell;

a second sensor insensitive to oxides of nitrogen, the second sensor including an electrochemical cell containing an oxygen ion conductive electrolyte layer having at least two electrodes disposed on the opposite surfaces thereof for producing a second sensor signal indicative of an oxygen partial pressure of the gases introduced into the electrochemical cell;

means connected to the first and second sensors for calculating an NOx concentration based on the first and second sensor signals;

a first passage for introducing gases into the electrochemical cells of the first and second sensors;

first and second restricted orifices provided in the first passage upstream of the first and second sensors for restricting a gas flow to the first and second sensors;

a second passage connected to the first passage between the first and second orifices; and

a suction pump connected to the first passage downstream of the first and second sensors for producing a suction vacuum in the first passage and to the second passage for producing a suction vaccum in the second passage.

4,988,429

MEASURING CELL FOR AN ELECTROCHEMICAL GAS SENSOR

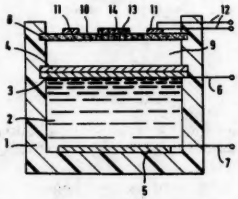
Hans Matthiessen, Bad Schwartau, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Jun. 22, 1990, Ser. No. 544,107

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1989, 3921526

Int. Cl.[5] G01N *27/40*

U.S. Cl. 204—408 **7 Claims**



1. A measuring cell for an electrochemical gas sensor for detecting a gaseous substance, the measuring cell comprising:

a housing having an opening directed toward the sample to be measured and defining an electrolyte chamber;

an electrolyte contained in said chamber;

a measuring electrode and a counter electrode disposed in said chamber so as to be in spaced relationship to each other;

a porous membrane mounted in said housing for separating said chamber from the ambient to be investigated and to contain said electrolyte in said chamber;

said membrane being permeable to the gaseous substance to be detected;

a diffusion barrier made of a material having a good thermal conductivity and being mounted in said housing so as to be interposed between the ambient and said membrane;

said diffusion barrier having a surface facing the ambient and having passage means formed therein for passing the gaseous substance to said porous membrane; and,

temperature-sensitive means formed on said surface in close proximity to said passage means for detecting the temperature where the gaseous substance diffuses through the diffusion barrier.

4,988,430

SUPPLYING FCC LIFT GAS DIRECTLY FROM PRODUCT VAPORS

Paul A. Sechrist, Des Plaines; David A. Lomas, and Daniel N. Myers, both of Arlington Heights, Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 27, 1989, Ser. No. 457,463

Int. Cl.[5] C10G *11/20*

U.S. Cl. 208—113 **16 Claims**

12. A process for the fluidized catalytic cracking (FCC) of hydrocarbons in a riser conversion zone said process comprising:

(a) contacting regenerated catalyst in an upstream portion of said riser conversion zone with a lift gas comprising hydrocarbons and steam, said hydrocarbons in said lift gas comprising C_3 and lower molecular weight hydrocarbons, and contacting a regenerated catalyst and lift gas mixture with an FCC feedstock in said riser conversion zone at a location downstream of the lift gas and catalyst contacting;

(b) discharging an effluent mixture comprising lift gas, hydrocarbons and spent catalyst from a downstream end of said riser conversion zone said downstream end having a location in a reactor vessel;

(c) collecting said effluent mixture in a separator, separating spent catalyst from said effluent mixture and withdrawing the rest of said effluent mixture from said reactor vessel;

(d) passing said spent catalyst downwardly from said reactor vessel into a stripper vessel, counter-currently contacting said spent catalyst with a stream of stripping steam to remove adsorbed hydrocarbons from the surface of said catalyst and withdrawing spent catalyst from the bottom of said stripper vessel;

(e) passing steam and hydrocarbons desorbed from the surface of said catalyst upwardly into said reactor vessel and withdrawing a gaseous mixture, having a temperature of at least 850° F. and comprising steam and material stripped from said spent catalyst, out of an upper section of said reaction vessel;

(f) cooling said gaseous mixture by indirect heat exchange with a feed water stream to generate steam and produce a cooled mixture having a temperature of less than 650° F;

(g) contacting the cooled mixture with a water stream to produce a quenched mixture having a temperature of less than 300° F. and scrub solid particles from said quenched mixture;

(h) separating condensed liquid from said quenched mixture to remove liquid and solids and produce a separator gas stream;

(i) compressing said separator gas stream to a pressure of between 15 to 50 psig; and

(j) combining said separator gas with steam to produce the lift gas of step (a).

4,988,431

PROCESS FOR PERFORMING CATALYTIC REACTIONS

Michael Heisel, Pullach; Freimut Marold, Neubiberg, and Reiner Lohmueller, Emden, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Sep. 16, 1987, Ser. No. 97,000

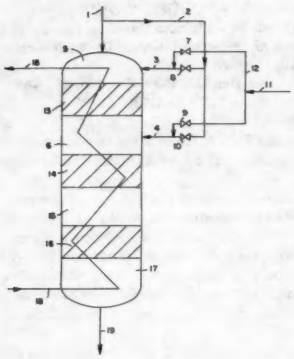
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1986, 3631642

Int. Cl.[5] C10G *23/00*

U.S. Cl. 208—67 **13 Claims**

1. In a process for performing a catalytic reaction having an intense heat of reaction, in which a reaction mixture is conducted through a catalyst bed from which the reaction heat is removed, the improvement wherein a first catalyst bed adjoins

an upstream granular bed of material which is catalytically inert with respect to the reactions in the adjoining first catalyst bed, passing said reaction mixture first through the upstream catalytically inert granular bed of material, then passing the



reaction mixture through at least two catalyst beds and through a catalytically inert bed positioned therebetween, and passing a heat exchange medium successively through said beds and in indirect heat exchange therewith.

4,988,432

REDUCING NO_x EMISSIONS WITH ANTIMONY ADDITIVE

Arthur A. Chin, Cherry Hill, N.J., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 28, 1989, Ser. No. 458,052
Int. Cl.[5] C10G *11/18*
U.S. Cl. 208—121 **14 Claims**

1. In a process for the catalytic cracking of a heavy hydrocarbon feed containing Ni and nitrogen compounds by contact with a circulating inventory of catalytic cracking catalyst to produce catalytically cracked products and spent catalyst comprising Ni or Ni compounds and coke comprising nitrogen compounds, and wherein said spent catalyst is regenerated by contact with oxygen or an oxygen-containing gas in a catalyst regeneration zone operating at catalyst regeneration conditions to produce hot regenerated catalyst comprising Ni or Ni compounds which is recycled to catalytically crack the heavy feed and said catalyst regeneration zone produces a flue gas comprising CO, CO2 and oxides of nitrogen, NO_x, the improvement comprising adding to the circulating catalyst inventory CO combustion promoter in an amount equivalent to 0.01 to 50 wt ppm Pt to reduce the CO content of the flue gas and reducing the NO_x content of the flue gas by adding to the circulating catalyst inventory a separate particle additive comprising antimony, said additive being added in an amount sufficient to reduce the production of NO_x relative to operation without said additive, and wherein said additive comprises a compound of antimony which does not substantially passivate the Ni or Ni compounds present on the cracking catalyst, nor deactivate the CO combustion promoter.

4,988,433

DEMETALATION OF HYDROCARBONACEOUS FEEDSTOCKS USING MONOBASIC CARBOXYLIC ACIDS AND SALTS THEREOF

John G. Reynolds, El Cerrito, and David C. Kramer, San Anselmo, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 239,152, Aug. 31, 1988, abandoned. This application May 30, 1990, Ser. No. 530,720
Int. Cl.[5] C10G *1/00*
U.S. Cl. 208—251 R **14 Claims**

1. A method for removing metals selected from the group consisting of Group IIA and Group VIII metals from hydrocarbonaceous feedstock comprising:

mixing said hydrocarbonaceous feedstock with an aqueous solution of a metals sequestering agent, said agent consisting essentially of monobasic carboxylic acid or salts thereof, whereby said aqueous solution forms an aqueous phase containing said metals and a hydrocarbon phase; and

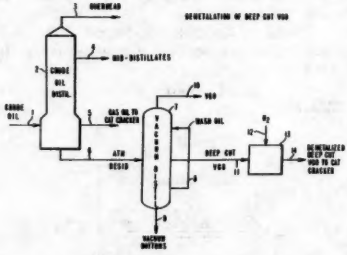
separating said aqueous phase from the substantially demetalated hydrocarbon phase.

4,988,434

REMOVAL OF METALLIC CONTAMINANTS FROM A HYDROCARBONACEOUS LIQUID

Clyde L. Aldridge; Roby Bearden, Jr., and Kenneth L. Riley, all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 13, 1989, Ser. No. 449,177
Int. Cl.[5] C10G *45/08, 15/00*
U.S. Cl. 208—251 H **13 Claims**



1. A process for the demetallation of a hydrocarbonaceous oil, the process comprising treating the oil in a demetallation zone, wherein said oil is subjected to hydrogen in the presence of an effective amount of catalyst consisting essentially of vanadium supported on activated carbon to remove from the oil a substantial amount of the metals.

4,988,435

AUTOMATIC SORTING SYSTEM

Minao Kimura, Tokorozawa, and Shinichiro No, Hoya, both of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 264,563
Claims priority, application Japan, Oct. 30, 1987, 62-273338
Int. Cl.[5] B07C *5/36*; B65G *47/46, 47/82*
U.S. Cl. 209—560 **29 Claims**

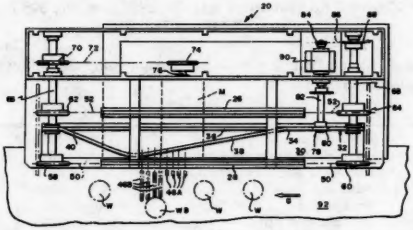
1. An automatic sorting system for sorting objects which are conveyed in a machine direction, comprising:

a control guide having a groove which diverges into a plurality of branches having upstream ends of different depths, at least one of said branches having a diverting wall at its upstream end;

moving members which have pins which extend into and are guided by said control guide, said moving members hav-

ing means for diverting the objects in a direction which is transverse to said machine direction; and

at least one pin-moving device for moving the pins of the moving members vertically in response to signals from a detecting device, said at least one pin-moving device



being located upstream of the branches so that the vertical position to which the pin is moved by the pin-moving device will determine whether or not said pin will contact said diverting wall and thus determine which of the branches will be followed by the pins and their respective moving members.

4,988,436

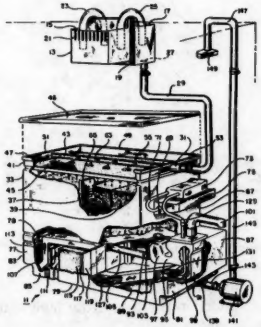
AQUARIUM FILTRATION SYSTEM WITH LIQUID DISTRIBUTOR AND PROTEIN SKIMMER

Larry Cole, 829 Rockledge, Garland, Tex. 75043

Filed Oct. 11, 1989, Ser. No. 419,908

Int. Cl.[5] A01K *63/04*

U.S. Cl. 210—169 **17 Claims**



1. A filtration system for an aquarium, comprising:

a biological filter chamber having an inlet supplied with aquarium water to be filtered, an outlet for returning filtered water to the aquarium, and an interior containing a biological filter medium;

a trickle plate located at the inlet to said biological filter chamber for supplying an even distribution of water to said filter medium; and

a stationary spray bar located above said trickle plate and connected to said inlet, said stationary spray bar being provided with a plurality of apertures for supplying water to said trickle plate.

7. A filtration system for an aquarium, comprising:

a biological filter chamber having an inlet supplied with aquarium water to be filtered, an outlet for dispensing filtered water, and an interior containing a biological filter medium sufficient to grow nitrosomonas and nitrobacter organisms;

a reservoir chamber located below said biological filter chamber, said reservoir chamber having a bottom and opposing sidewalls which define a main interior region of said reservoir, and having a protein skimmer which is at least partly immersed within said main interior region, said protein skimmer having a vertical inlet opening which communicates with said biological filter chamber outlet, whereby water from said biological filter chamber is fed to said vertical inlet opening, and wherein said protein skimmer has a crossflow path located below said vertical inlet opening for routing at least a portion of the incoming water from said vertical inlet opening to an isolated region of said reservoir chamber, said protein skimmer also having an extraction chamber outlet and including an oxygenating passage with means supplying air under pressure, said oxygenating passage communicating said vertical inlet opening and said isolated region of said reservoir, said oxygenating passage including a ramp region which slants upwardly at an inclined angle from said reservoir bottom in the direction of said extraction chamber outlet.

4,988,437

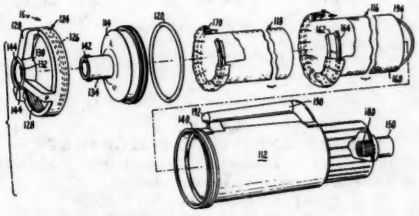
IN-LINE LEAF TRAP

Alexander A. Gefter, San Francisco, and Kenneth N. Marshall, Novato, both of Calif., assignors to Arneson Products, Inc., Corte Madera, Calif.

Filed Oct. 19, 1989, Ser. No. 423,963

Int. Cl.[5] B01D *35/02*

U.S. Cl. 210—237 **7 Claims**



1. A leaf trap connectable in-line with a vacuum hose of a swimming pool comprising:

a housing including a main body and a separable lid, with the main body including a cylindrical threaded region adjacent the lid, said housing including a pair of opposed fittings located in said lid and main body for connection to said vacuum hose, with the fitting on said lid including a key means, said housing for receiving a filter means for capturing debris passing through said housing; and

a locking ring configured to fit over said lid and including a threaded region engagable with said threaded region on the main body of the housing to seal the housing, said locking ring further including a yoke configured to be mounted over the fitting formed on said lid, said yoke including complementary slots which can be aligned with said key means when installing said locking ring in place over said lid.

4,988,438

OIL SPILL CORRAL

Harold L. Eddleman, P.O. Box 1224, Newport, Oreg. 97365

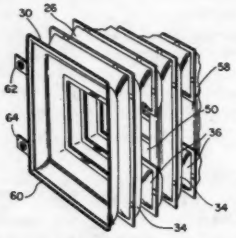
Filed Oct. 19, 1989, Ser. No. 424,118

Int. Cl.[5] E02B *15/04*

U.S. Cl. 210—242.3 **14 Claims**

14. An oil spill corral including an elongated, horizontal and flexible tubular member for extending at least partially about and containing, against further dispersion, an oil spill area on a

body of water, said corral defining opposite inner and outer longitudinal sides for opposing and facing away from, respectively, said oil spill area and including buoyant means operative to float said corral in a partially submerged condition on said body of water, said inner longitudinal side of said tubular member including longitudinally spaced surface water and oil entrance openings therein opening into the interior of said tubular member for the entrance of at least the upper surface layer of water and oil floating thereon into the interior of said



tubular member at a level spaced above the lower surface of the interior thereof, oil collection locations spaced along said tubular member including means for withdrawing collected oil and water from therewithin for conveyance to a location remote from said tubular member, said tubular member being accordion pleated such that said inner longitudinal side defines horizontally outwardly divergent, generally partial cylindrical and vertically extending surfaces defining the limits of each of said openings spaced longitudinally of said tubular member and extending throughout the vertical extend of each opening.

4,988,439

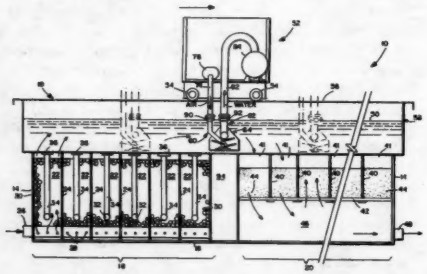
TWO STAGE TRAVELING BRIDGE FILTER

Carlton Medders, II, Thomasville, Ga., assignor to Davis Water & Waste Industries, Inc., Thomasville, Ga.

Filed Feb. 27, 1989, Ser. No. 315,928

Int. Cl.[5] B01D *24/18, 24/46*

U.S. Cl. 210—264 **20 Claims**



1. A traveling bridge filter cleaning system comprising a liquid filtration tank having a first portion with a plurality of adjacent up-flow roughening cells and a second aligned portion with a plurality of adjacent down-flow polishing filter cells, each of said cells containing filter media, a traveling bridge carriage located above said tank and movable along said tank, said carriage mounting air scour means and liquid backwash means within a single hood which is adapted to successively and sealingly engage each of said cells, said air scour means having an inlet conduit.

4,988,440

COOKING OIL FILTER

Robin D. Bernard, Bothell; John G. Gardner, Woodinville, and Jun Ueki, Seattle, all of Wash., assignors to Filtercorp, Inc., Bothell, Wash.

Continuation-in-part of Ser. No. 303,854, Jan. 30, 1989, Pat. No. 4,959,144. This application Aug. 18, 1989, Ser. No. 395,722

Int. Cl.[5] B01D *39/18*

U.S. Cl. 210—504 **10 Claims**

1. A filter having a porous body comprising the following composition

activated carbon	15% to 35%
calcium silicate, magnesium silicate, or mixtures thereof	15% to 40%
cellulosic fiber	25% to 40%
resin binder	up to 2%
diatomaceous earth	0% to 30%

all percentages herein by weight based on the total weight of the foregoing components.

4,988,441

CLARIFICATION APPARATUS

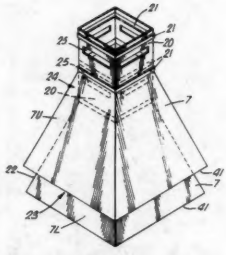
John Moir, 24 Hazel Close, Highcliffe, Christchurch, Dorset, England

Filed Aug. 8, 1989, Ser. No. 391,133

Claims priority, application United Kingdom, Aug. 9, 1988, 8818866

Int. Cl.[5] B01D *21/02*

U.S. Cl. 210—522 **24 Claims**



1. Liquor clarifying apparatus comprising:

a tank having a top;

at least one inlet into the tank;

at least one launder in the top of the tank and from which liquid can be discharged;

a plurality of first outlets for clarified liquor and that open into the at least one launder;

at least one second outlet from the base of the tank for separated solids, and

a plurality of settling assemblies

wherein each settling assembly comprises

a substantially vertical collection duct that leads up into one of the said first outlets for discharging clarified liquor into one said launder

a stack of substantially pyramidal settling plates each of which comprises a neck portion and a downwardly inclined pyramidal portion, each adjacent pair of pyramidal plates being spaced apart by spacing means consisting essentially of a substantially vertical neck to define a pyramidal cell that leads from the neck downwardly through an inclined length of 5 to 30 cm to a parallel sided outlet slot that extends around the pyramidal cell and that has a vertical depth of at least 1 cm,

and in which

each neck has a length of 1–10 cm and is either a separate

spacer neck or is integral with one of the said pyramidal plates,

the collection duct either comprises the said integral necks or pipe over which the necks are slidably fitted, and

there are orifices extending from each cell through each neck and into the duct for passage of clarified liquor from each cell into the duct and up into the launder.

4,988,442

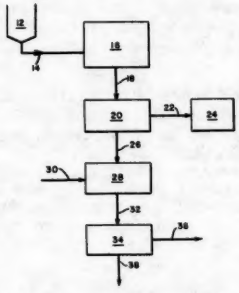
PROCESS FOR DEWATERING OF BIOLOGICAL SLUDGE

Ronald E. Highsmith, Skaneateles; Frederick J. Good, Jr., Camillus, both of N.Y.; Francis S. Lupton, Evanston, Ill.; Kenneth P. Kehrer, Lancaster, Pa., and Glenn E. Petrie, Bartlett, Ill., assignors to Polypure, Inc., Solvay, N.Y.

Filed Nov. 7, 1988, Ser. No. 267,589

Int. Cl.[5] C02F *1/02*

U.S. Cl. 210—609 **15 Claims**



1. A dewatering process consisting essentially of the steps

(a) heating biological sludge to a temperature of about 90° to about 150° C. which corresponds to pressure of about 0 to about 55 psig and retaining said biological sludge at said temperature for less than about 15 minutes;

(b) centrifuging said heated biological sludge to isolate the solids of said heated biological sludge from the liquid of said heated biological sludge:

(c) chemically conditioning said isolated solids with a polymer solution; and

(d) dewatering said conditioned solids to produce a high solids sludge.

4,988,443

BIOREACTOR PROCESS FOR CONTINUOUS REMOVAL OF ORGANIC TOXICANTS AND OTHER OLEOPHILC SOLUTES FROM AN AQUEOUS PROCESS STREAM

Alan S. Michaels, Chestnut Hill, Mass.; Steven W. Peretti, Durham, and Christopher J. Tompkins, Raleigh, both of N.C., assignors to North Carolina State University, Raleigh, N.C.

Filed Jul. 3, 1990, Ser. No. 547,862

Int. Cl.[5] C02F *3/34*

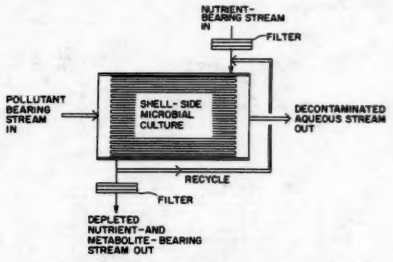
U.S. Cl. 210—611 **27 Claims**

1. A process for continuously removing selected organic toxicants or other oleophilic solutes from an aqueous process stream by employing microorganisms in a hollow fiber membrane module to metabolize said solutes into water soluble metabolites, said module comprising a lumen side and a housing side with said microorganisms being located in said housing side thereof, said process comprising:

continuously providing a fluid process stream containing a low water solubility toxicant or other oleophilic solute therein to the lumen side of a permeably selective hollow fiber membrane module;

continuously providing an aqueous nutrient stream comprising a water soluble nutrient to the housing side of said hollow fiber membrane module;

selectively transporting said solute through the hollow fiber membrane of said module to said microorganisms to be metabolized thereby while preventing transportation of said water soluble nutrient and metabolite in said housing side through said hollow fiber membrane into said lumen side, said hollow fiber membrane further serving to concentrate said solute therein during said transportation therethrough;



continuously removing said solute depleted fluid process stream from said lumen side of said hollow fiber membrane module; and

continuously removing said aqueous nutrient stream and metabolites contained therein from the housing side of said hollow fiber membrane module.

4,988,444

PREVENTION OF BIOFOULING OF REVERSE OSMOSIS MEMBRANES

Lynn E. Applegate, Wilmington, Del.; Carl W. Erkenbrecher, Jr., Elkton, Md., and Harvey Winters, Pompton Lakes, N.J., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 12, 1989, Ser. No. 351,238

Int. Cl.[5] C02F *1/76*

U.S. Cl. 210—636 **6 Claims**

1. A process for preventing aftergrowth of microorganisms and the biofouling of equipment which equipment is adversely affected by chlorine, the equipment being fed by a liquid process feed stream containing chlorine degradable organic material that, when in degraded form, provides an energy/carbon food source that is assimilable by microorganisms and that, in the absence of chlorine, enables microorganisms to grow and reproduce comprising adding into the process feed stream an amount of a chloramine sufficient to kill at least 99 percent of microorganisms present and then dechloraminating prior to the process stream's entering the equipment.

4,988,445

SPIRAL WOUND FILTRATION SYSTEM AND METHOD OF UTILIZING SAME

Clyde W. Fulk, Jr., Charlotte, N.C., assignor to Koch Membrane Systems, Inc., Wilmington, Mass.

Filed Feb. 22, 1990, Ser. No. 483,391

Int. Cl.[5] B01D *63/00*

U.S. Cl. 210—652 **9 Claims**

1. A filtration system for separating a fluid feed stream into a concentrate fraction and a permeate fraction, said system comprising:

a first stage comprising a plurality of filtration modules disposed in side-by-side relationship for parallel flow of said fluid feed stream through said first stage modules, each of said modules having an inlet, a concentrate outlet, and a permeate outlet;

a second stage comprising a plurality of filtration modules coupled in parallel with each other;

means for enabling concentrate from said first stage module

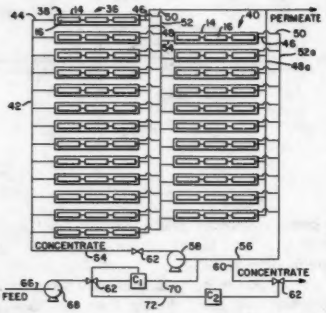
to pass directly to said second stage modules without passing through a pump;

means for forcing said feed stream through said first and second stages; and

means for recycling a portion of the concentrate from said second stage to said first stage.

6. A method of filtering a liquid comprised of at least two separable components, said method comprising the steps of:

providing a plurality of first filtration modules in side-by-side relationship;



passing a feed stream of said liquid through said modules in parallel flow;

feeding the concentrate from said first modules directly to a plurality of second modules without passing through a pump, said second modules being disposed in side-by-side relationship for parallel flow of said concentrate through the second modules; and

recycling a portion of the concentrate from said second modules to said feed stream.

4,988,446

METHOD FOR SPECTROSCOPIC ANALYSIS OF HYDROCARBONS

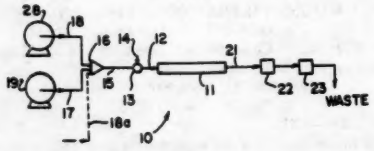
Joel I. Haberman, Seabrook, Tex.; Robert E. Overfield, Calgary, Canada, and Winston K. Robbins, New Providence, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 143,744, Jan. 14, 1988, Pat. No. 4,865,746, which is a continuation-in-part of Ser. No. 6,382, Jan. 23, 1987, abandoned. This application May 30, 1989, Ser. No. 358,779

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—656 **23 Claims**



17. A method for the chromatographic analysis of a hydrocarbon oil comprising the steps of:

(a) passing a mixture of the hydrocarbon oil and a carrier phase in contact with a first and second chromatographic stationary phase over a time interval so as to retain the components of the hydrocarbon oil on the stationary phases;

(b) passing in contact with the first and second stationary phases a first mobile phase of a weak solvent having a solubility parameter from 7.0 to 7.8 $cal^{0.5}/cm^{1.5}$ for a second time interval sufficient to elute saturates and mono aromatics from the first stationary phase;

(c) bypassing the first stationary phase and continuing passing the weak solvent to the second stationary phase for a third time interval sufficient to complete substantially the elution of mono aromatics;

(d) bypassing the second stationary phase and passing the weak solvent to the first stationary phase for a fourth time interval sufficient to elute 2-ring aromatics;

(e) passing solvent of increased strength to the first stationary phase for a fifth time interval sufficient to elute 3-ring aromatics;

(f) passing solvent of a strength greater than in step (e) to the first stationary phase for a sixth time interval sufficient to elute 4-ring aromatics;

(g) passing solvent of a strength greater than in step (f) to the first stationary phase for a seventh time interval sufficient to elute polar compounds;

(h) recovering the solvent from each of steps (b)–(g);

(i) monitoring the solvents recovered in step (h) and detecting saturates, mono aromatics, 2-ring aromatics, 3-ring aromatics, 4-ring aromatics, and polars.

4,988,447

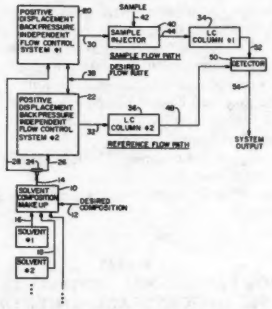
REFERENCE FLOW LIQUID CHROMATOGRAPHY SYSTEM WITH STABLE BASELINE

Lance Hellinger, San Jose, Calif., assignor to Spectra Physics, Inc., San Jose, Calif.

Division of Ser. No. 456,021, Dec. 22, 1989, which is a continuation of Ser. No. 155,592, Feb. 12, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 463,701

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—659 **5 Claims**



5. A method of pumping liquid through a liquid chromatography system having first and second flow paths containing first and second liquid chromatography columns, respectively, said first and second liquid chromatography having identical flow path lengths comprising:

making a solvent composition;

dividing the solvent composition into first and second streams;

injecting a sample having at least some unknown characteristics into said first stream;

pumping said first and second streams through independent first and second liquid chromatography columns, respectively, using first and second pumps coupled at points in said first and second flow paths which are not common to said first and second flow paths, to said first and second liquid chromatography columns, respectively, said first and second pumps being operated so as to maintain identical flow rates through said first and second liquid chromatography columns regardless of changes in the back pressure resisting flow which occur in either of said first or second liquid chromatography columns;

detecting the optical characteristics of the liquid streams emerging from said first and second liquid chromatography columns using refractive index detectors and generating signals indicative of the refractive index of each of said streams emerging from said first and second liquid chromatography columns; and

determining the differences between said signals from said refractive index detectors thereby indicating the differences in optical characteristics between the two streams as said streams emerge from said liquid chromatography columns, and outputting a signal indicative of said differences.

4,988,448

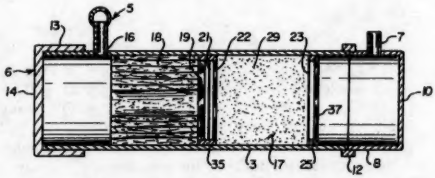
METHOD FOR REMOVING SUBSTANCES FROM A SOLUTION

Manfred J. Woog, 1040 Pershing St., Craig, Colo. 81625

Filed Dec. 15, 1989, Ser. No. 451,323

Int. Cl.[5] B01D *15/00, 37/03*

U.S. Cl. 210—665 **10 Claims**



1. A method of treating a waste solution to remove predetermined chemicals and metals before said waste solution is discharged into the environment, including the steps of:

providing a generally cylindrical housing having a first interior chamber and a second interior chamber in communication therewith, and inlet means in communication with said first interior chamber and outlet means in communication with said second interior chamber,

introducing said waste solution into the first interior chamber housing through the inlet means,

introducing at least one precipitation-causing solution of a predetermined pH into said first interior chamber through said inlet means,

mixing the waste solution with said precipitation-causing solution to facilitate precipitation of metals from the waste solution,

collecting precipitated metals,

subsequently introducing the waste solution into said second interior chamber,

filtering particles out of said solution,

establishing contact between said solution and activated carbon disposed within said second interior chamber,

adsorbing said chemicals out of said solution onto said activated carbon, and

discharging the filtered solution out of the housing through said outlet means.

4,988,449

FLUID-PERMEABLE AGENT FOR NON-WOVEN SHEETS OF POLYOLEFIN FIBERS

Tomohiro Kato, Nagoya; Yoshio Takasu, and Makoto Minafuji, both of Aichi, all of Japan, assignors to Takemoto Yushi Kabushiki Kaisha, Aichi, Japan

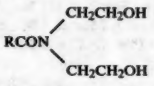
Continuation-in-part of Ser. No. 210,636, Jun. 23, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 400,356

Claims priority, application Japan, Jun. 25, 1987, 62-158162

Int. Cl.[5] D06M *13/10, 13/419, 13/473, 13/292*

U.S. Cl. 252—8.8 **5 Claims**

1. A fluid-permeable agent for providing fluid-permeability to non-woven sheets of polyolefin fibers, said agent containing 70–95 wt% of aliphatic diethanol amide shown by the following formula:



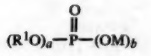
(A)

where R is alkyl or alkenyl group with 11–17 carbon atoms, and

5–30 wt% of surfactant including one or more selected from the following:

(a) non-ionic surfactants each derived from an addition reaction of alkylene oxide with 2–3 carbon atoms to an active hydrogen compound having alkyl or alkenyl group with 11–22 carbon atoms as a hydrophobic group, 3–10 moles of said alkylene oxide being added per hydrophobic group of said active hydrogen compound being added in said addition reaction,

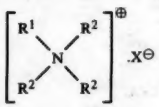
(b) alkyl phosphate salt shown by the following formula:



(B)

where R^1 is alkyl or alkenyl group with 12–18 carbon atoms, M is Na, K or ammonium, and a and b are integers equal to or greater than 1 such that $a+b=3$,

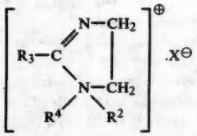
(c) quaternary ammonium salt shown by the following formula:



(C)

where R^1 is alkyl or alkenyl group with 12–18 carbon atoms, R^2 is H, alkyl or hydroxyalkyl group with 1–2 carbon atoms or R^1, and X is halogen, residue of organic or inorganic acid, or alkyl sulfate or alkyl phosphate with 1–2 carbon atoms, and

(d) alkyl imidizolinium salt shown by the following formula:



(D)

R^2 is H, alkyl or hydroxyalkyl group with 1–2 carbon atoms, or alkyl or alkenyl group with 12–18 carbon atoms, X is halogen, residue of organic or inorganic acid, or alkyl sulfate or alkyl phosphate with 1–2 carbon atoms, R^3 is alkyl or alkenyl group with 11–17 carbon atoms and R^4 is C_2H_4OH, $C_2H_4NH_2$, $C_2H_4NHCOCH_3$ or $C_2H_4NHCOR^3$.

4,988,450

SHALE-STABILIZING DRILLING FLUID ADDITIVES

James A. Wingrave, Chadds Ford, Pa.; Thomas S. Carter, Spring, Tex., and Charles F. Palmer, Jr., Christiana, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 168,306, Mar. 15, 1988, abandoned. This application Mar. 3, 1989, Ser. No. 316,731
Int. Cl.[5] C09K 7/02; E21B 21/00
U.S. Cl. 252—8.514 25 Claims

1. An additive composition for aqueous drilling fluids which imparts improved wellbore stability when used in drilling shale formations consisting essentially of of one or more water-soluble partially hydrolyzed high molecular weight polyfunctional polymers of vinyl acetate or acrylamide capable of forming several nucleophilic sites when treated with base, and an effective quantity of one or more potassium salts whose anions are Bronsted-Lowry bases of sufficient strength to raise the pH of the resultant drilling fluid to above 9.0 but which are relatively weak nucliophiles when compared to the polymeric nucleophilic sites, wherein said polymer and said potassium salt are present in polymer:potassium salt weight ratio between about 1:20 and about 3:1.

4,988,451

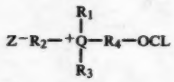
STABILIZATION OF PARTICLES CONTAINING QUATERNARY AMMONIUM BLEACH PRECURSORS

Charles C. Nunn, Rutherford, N.J., and William J. Worley, Loveland, Ohio, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Jun. 14, 1989, Ser. No. 366,121
Int. Cl.[5] C11D 3/375, 7/54
U.S. Cl. 252—95 18 Claims

1. A particulate detergent composition additive, each particle being an intimately blended mixture comprising:

(i) from 30 to 95% of a precursor compound having the formula:



(I)

wherein:

R_1, R_2 and R_3 are each a radical selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, alkaryl, aryl, phenyl, hydroxyalkyl, polyoxyalkylene, and R_4OCOL;

or two or more of R_1, R_2, and R_3 together form an alkyl-substituted or unsubstituted nitrogen-containing heterocyclic ring system;

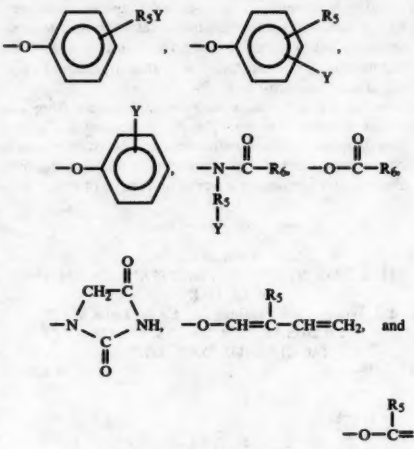
or at least one of R_1, R_2, and R_3 is attached to R_4 to form an alkyl substituted or unsubstituted nitrogen-containing heterocyclic ring system;

R_4 is selected from a bridging group consisting of alkylene, cycloalkylene, alkylenephenylene, phenylene, arylene, and polyalkoxylene; and wherein the bridging group can be unsubstituted or substituted with C_1–C_{20} atoms selected from alkyl, alkenyl, benzyl, phenyl and aryl radicals;

Z^- is a monovalent or multivalent anion leading to charge neutrality when combined with Q^+ in the appropriate ratio and wherein Z^- is sufficiently oxidatively stable not to interfere significantly with bleaching by a peroxy carbonic acid;

Q is nitrogen or phosphorous; and

L is selected from the group consisting of



and

wherein R_5 and R_6 are a C_1–C_{12} alkyl group, R_7 is H or R_5, and Y is selected from the group consisting of H, —SO M , —COO M , —SO M , $—N^+(R_5)_3X^-$, NO_2, OH, and O $←N(R_5)_2$ and mixtures thereof; M^+ is a cation which provides solubility to the precursor, and X^- is an anion which provides solubility to the precursor;

(II) a stabilizing agent for said precursor present in an effective amount to restrain hydrolysis, said stabilizing agent being selected from the group consisting of solid inorganic acids and C_4 or higher organic acids having at least one carboxylic group; and

(iii) a dispersing agent which is a water-soluble alkoxylated material having about 10 to 100 moles of alkoxide per mole hydrophobe present in an effective amount to promote dispersion of the particulate in an aqueous medium, said agent being selected from the group consisting of alkoxylated fatty alcohols, alkoxylated fatty acids, alkoxylated alkylphenols, polypropoxylated-polyethoxylated copolymers and mixtures thereof, the ratio of stabilizing agent to dispersing agent ranging from about 5:1 to 1:5.

4,988,452

LIQUID AUTOMATIC DISHWASHING DETERGENT COMPOSITIONS CONTAINING BLEACH-STABLE NONIONIC SURFACTANT

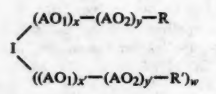
George C. Kinstedt, West Chester, and Sherri L. Myers, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 9, 1988, Ser. No. 204,446
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.
Int. Cl.[5] C11D 1/00
U.S. Cl. 252—99 21 Claims

1. A liquid automatic dishwashing detergent composition comprising:

(a) hypochlorite bleach to yield available chlorine in an amount of from about 0.1% to about 5%; and

(b) from about 0.1% to about 5% of a nonionic surfactant having the following structure:



wherein I is the residue of a compound selected from the group

consisting of a monohydroxyl compound, a dihydroxyl compound, and a polyhydroxyl compound; AO_1 and AO_2 are oxyalkyl groups and one of AO_1 and AO_2 is propylene oxide with the corresponding x or y being greater than zero, and responding x or y being greater than zero, and the molar ratio of propylene oxide to ethylene oxide is from about 2:1 to about 8:1 ; R and R are selected from the group consisting of alkyl aryl, aryl alkyl, alkyl, aryl, cycloalkyl, and mixtures thereof; w is less than 8 and x' and y' are greater than or equal to zero.

4,988,453

TRANSPARENT SOAP BAR CONTAINING A MONOHYDRIC AND DIHYDRIC ALCOHOL

John G. Chambers; Terry Instone, and Brian S. Joy, all of Wirral, England, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Feb. 27, 1990, Ser. No. 486,032

Claims priority, application United Kingdom, Mar. 3, 1989, 8904938

Int. Cl.[5] C11D *9/00, 15/04, 9/22, 17/00*

U.S. Cl. 252—122 **10 Claims**

1. Translucent detergent bars comprising, with respect to the total weight of the bar, 30 to 45 wt % soap, 5 to 15 wt % monohydric alcohol having 1 to 3 carbon atoms, 5 to 15 wt % dihydric alcohol selected from the group consisting of propane-1,2-diol, propane-1,3-diol and dipropylene glycol, and water.

4,988,454

LOW PHOSPHORUS CONTAINING DETERGENT POWDERS AND PROCESS FOR PREPARING THEM: SURFACTANT, ALUMINOSILICATE, SODIUM SILICATE AND POLYACRYLATE

Jan H. Eertink, Vlaardingen; Seeng D. Liem, VR Rhoon, both of Netherlands; Antonio Malguzzi, and Ronald M. Morris, both of Milan, Italy, assignors to Lever Brothers Company Division of Conopco, Inc., New York, N.Y.

Continuation of Ser. No. 30,204, Mar. 25, 1987, abandoned. This application May 14, 1990, Ser. No. 523,197

Claims priority, application United Kingdom, Apr. 4, 1986, 86/08291; Apr. 14, 1986, 86/09042

Int. Cl.[5] C11D *3/12, 11/02, 17/06*

U.S. Cl. 252—140 **9 Claims**

1. A process for the production of a detergent powder having 1) a phosphorous content of less than 2.5%, b) at least one detergent active compound selected from the group consisting of anionic and nonionic detergent active compounds, c) 10 to 60% of crystalline or amorphous sodium aluminosilicate builder, d) 1 to 10% of water-soluble sodium silicate and e) a homopolymer or a copolymer of acrylic acid or its salts having an average molecular weight of from about 14,000 and above as a polymeric powder structurant, which process comprises:

(1) spray-drying a slurry comprising the sodium aluminosilicate, 0.5 to 10% of the acrylic homo- or copolymeric powder structurant, by weight of the final powder, 0 to 2% water-soluble sodium silicate, by weight of the final powder and at least one said detergent active compound; and

(2) admixing with said spray-dried powder obtained from step (1) from 1 to 10% by weight of particulate sodium silicate powder in the form of a particulate solid, having a SiO_2:Na_2O mole ratio of from 3.0 to 1.0, to 1.0 to 1.0 provided that the amount of silicate admixed in step (2) is such that the total sodium silicate in the final powder does not exceed 10%, all percentages being weight percent and based on the final powder.

4,988,455

AZEOTROPE-LIKE COMPOSITIONS OF 1,1-DICHLORO-1,2,2-TRIFLUOROPROPANE AND ALKANOL HAVING 1 TO 4 CARBON ATOMS

Hillel Magid, Buffalo; Richard E. Eibeck, Orchard Park; Michael Van Der Puy, Cheektowaga; Richard M. Hollister, Buffalo, and Dennis M. Lavery, Springville, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Oct. 6, 1989, Ser. No. 417,985

Int. Cl.[5] C11D *7/30, 7/50*

U.S. Cl. 252—171 **28 Claims**

1. Azeotrope-like compositions consisting essentially of from about 82 to about 95 weight percent 1,1-dichloro-1,2,2-trifluoropropane and from about 5 to about 18 weight percent methanol which boil at about 49.0° C. at 760 mm Hg.

4,988,456

PROCESS FOR PRODUCING W/O/W TYPE MULTIPLE EMULSION FOR MEDICINES

Yasuyuki Takahashi; Toshiro Yoshida, and Takeshi Takahashi, all of Tokyo, Japan, assignors to Meiji Milk Products Company Limited, Tokyo, Japan

Continuation of Ser. No. 795,357, Oct. 15, 1985, abandoned. This application Jul. 10, 1989, Ser. No. 376,943

Claims priority, application Japan, Mar. 26, 1984, 59-056324; PCT Int'l Appl., Mar. 25, 1985, PCT/JP85/00143

Int. Cl.[5] B01J *13/00;* **A61K** *31/20*

U.S. Cl. 252—314 **3 Claims**

1. A process for producing a W/O/W type multiple emulsion for the production of medicines and cosmetics, comprising the steps of:

(a) adding an emulsifying amount of polyglycerol polyrincinoleate to an oil phase;

(b) forming a W/O emulsion by adding an aqueous phase to the product obtained in step (a);

(c) forming the W/O/W emulsion by adding said W/O emulsion obtained by step (b) to an outer aqueous phase;

(d) including a medicine or cosmetic within the W/O/W emulsion.

4,988,457

Patent Not Issued For This Number

4,988,458

LIQUID CRYSTAL PHASE CONTAINING ADMIXTURES WHICH EFFECT TEMPERATURE COMPENSATION

Gerd Heppke, and Feodor Oestreicher, both of Berlin, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 911,955, Sep. 26, 1986, abandoned. This application Jan. 26, 1989, Ser. No. 303,029

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534777

Int. Cl.[5] C09K *19/430*

U.S. Cl. 252—299.63 **5 Claims**

1. A twistable liquid crystal phase containing at least two chiral compounds, which comprises at least one first chiral compound being a diester of two mesogenic carboxylic acids and either a chiral compound butane-2,3-diol or a chiral compound propane-2,3-diol exhibiting helix inversion within a temperature range of −40° C. to 200° C., and at least one second chiral compound having a high twisting capacity of a product p.c of less than 8 μm. % by weight and having an increase in pitch per K of 1% to 1% o.

4,988,459

USE OF OPTICALLY ACTIVE OXIRANE-2-CARBOXYLIC ACID ESTERS AS DOPANTS IN LIQUID-CRYSTAL MIXTURES, LIQUID-CRYSTAL MIXTURES CONTAINING SAME AND NOVEL OPTICALLY ACTIVE OXIRANE-2-CARBOXYLIC ACID ESTERS

Günter Scherowsky; Jürgen Gay, both of Berlin; Hans-Rolf Dübal, Königstein/Taunus; Claus Escher, Mühltal; Wolfgang Hemmerling, Sulzbach; Ingrid Müller, Hofheim am Taunus; Dieter Ohlendorf, Liederbach, and Rainer Wingen, Hattersheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

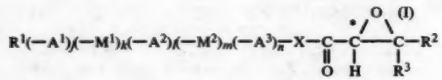
Filed May 26, 1988, Ser. No. 199,101

Claims priority, application Fed. Rep. of Germany, May 29, 1987, 3718174

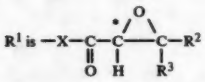
Int. Cl.[5] C09K *19/34*

U.S. Cl. 252—299.61 **6 Claims**

1. An optically active oxirane-2-carboxylic acid ester of the formula (I)



wherein



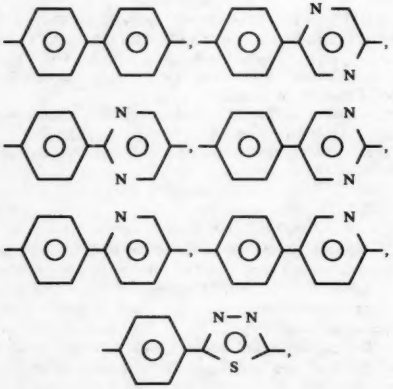
or a straight-chain or branched alkyl radical containing 1 to 16 carbon atoms or a straight-chain or branched alkenyl radical containing 3 to 16 carbon atoms, it being possible for said radicals themselves to contain asymmetric carbon atoms, it being possible for one or more nonadjacent —CH_2— groups to be replaced by —O—, —S—, —CO—, —O—CO— and/or —CO—O—, and it being possible for one or more hydrogen atoms to be replaced by F, Cl, Br or CN;

R^2 is H or alkyl containing 1 to 16 carbon atoms or cyclohexyl which may be substituted in 4-position by an alkyl chain containing 1 to 16 carbon atoms or 1,1′-bicyclohexyl which may be substituted in 4′-position by an alkyl chain containing 1 to 16 carbon atoms;

R^3 is H or alkyl containing 1 to 16 carbon atoms;

X is O or S; and

$(-A^1)_j(-M^1)_k(-A^2)_l(-M^2)_m(-A^3)_n$ is



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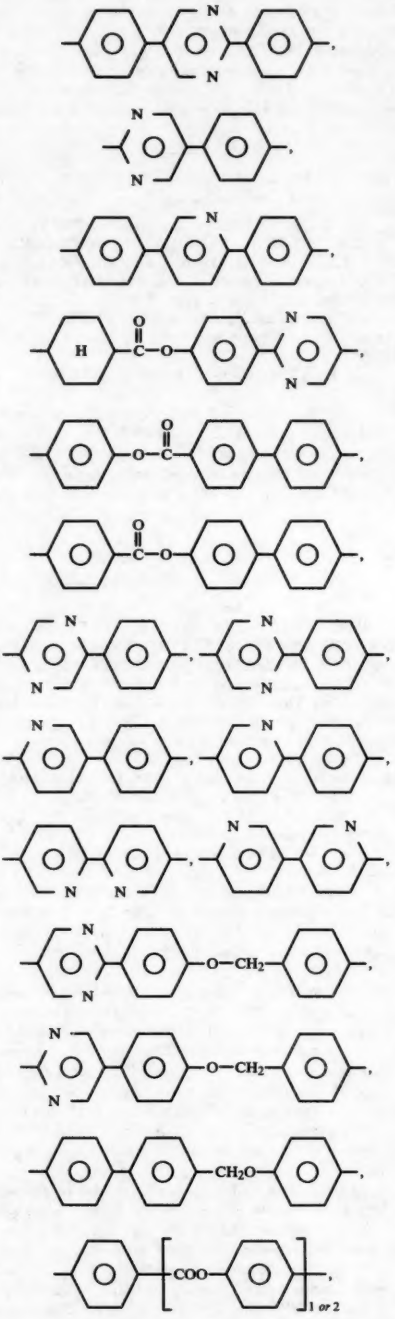

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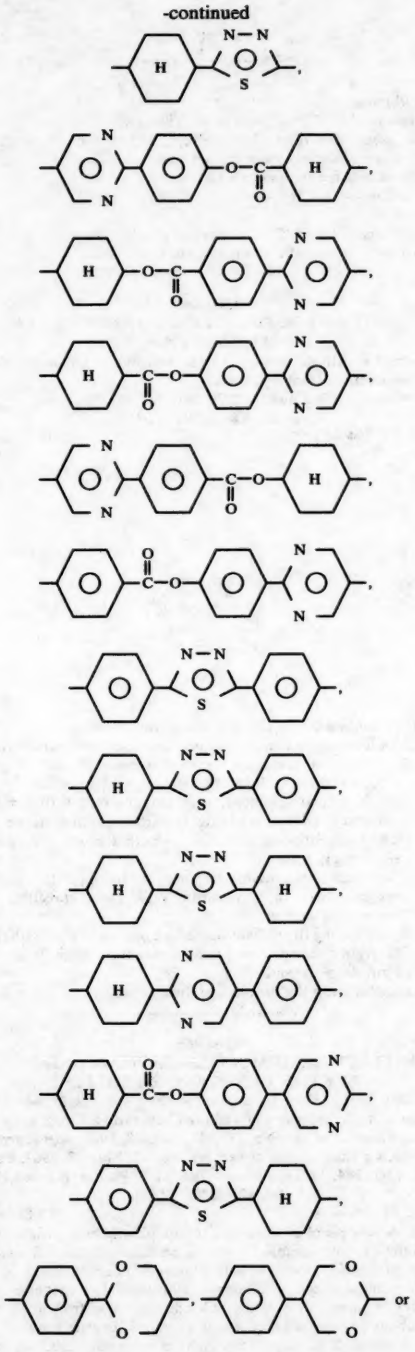

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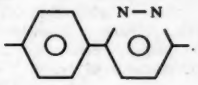


4,988,460

FERROELECTRIC LIQUID-CRYSTALLINE POLYMERIC COMPOSITION

Kazuharu Morita; Shunji Uchida, and Kimihiro Yuasa, all of Chiba, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Continuation of Ser. No. 243,425, Sep. 12, 1988, abandoned. This application Jun. 13, 1990, Ser. No. 539,321

Claims priority, application Japan, Oct. 2, 1987, 62-249209

Int. Cl.[5] C09K *19/54*

U.S. Cl. 252—299.5 **18 Claims**

1. A ferroelectric polymeric liquid-crystalline composition comprising a hydrogen bonded product of

a non-liquid-crystalline polymer having proton transfer functionality selected from the group consisting of poly(acrylic) acid), poly(methacrylic acid), polyacrylates, polymethacrylates, polyacrylamide, polyvinyl alcohol, polyvinyl acetate, polycarbonate, polyesters obtained by the condensation reaction of a dicarboxylic acid derivative and a diol derivative, polyamides obtained by the condensation reaction of a dicarboxylic acid derivative and a diamine derivative, polyamides obtained by the condensation reaction of a dicarboxylic acid derivative and a monoalcohol or monoamine derivative, the polymerization degree of the polymer being 10–10,000; and

a low-molecular weight liquid-crystalline compound which has a proton transfer functionality opposite to and reactive with the proton transfer functionality of said polymer, to produce hydrogen bonding, said low-molecular weight liquid-crystalline compound

is at least one compound selected from the group consisting of

(a) 2-methylbutyl 4'-(10-(2,2-diacetoxymethyl) propionyloxy decyloxy) biphenyl 4-carboxylate,

(b) 2-methylbutyl 4-(4'-{12-(2,2-dihydroxymethyl propionyloxy) dodecyloxy} benzoyloxy) benzene-4-carboxylate.

(c) 2-methylbutyl 4-(4'-{12-(2,2-deacetoxymethyl propionyloxy) dodecyloxy} benxoyloxy) benzene-4-carboxylate,

(d) 2-methylbutyl 4-(4'-{12-(2,2-dihydroxymethyl propionyloxy) dodecyloxy} benzoyloxy)biphenyl-4-carboxylate,

(e) 2-methylbutyl 4'-(4''-{12-(2,2-diacetoxymethyl propionyloxy) dodecyloxy}benzoyloxy)biphenyl-4-carboxylate,

(f) 2-methylbutyl 4-(4''-{12-(2,2-dihydroxymethyl propionyloxy) dodecyloxy} biphenyl-4'-carbonyloxy)benzoate,

(g) 2-methylbutyl 4-(4''-{12-(2,2-diacetoxymethyl propionyloxy) dodecyloxy} biphenyl 4'-carbonyloxy)benzoate, and

(h) 2-chloro-3-methylpentyl 4-(4''-{12-(2,2-diacetoxymethyl) propionyloxy} dodecyloxy) biphenyl-4'-carbonyloxy benzoate; the number of the proton transfer functionality groups of the non-liquid crystalline polymer being from 10:1 to 1:2 as compared with the low-molecular weight liquid-crystalline compound.

4,988,461

COMPOSITIONS OF WATER-DISPERSED AMINE-CONTAINING POLYMERS

Carl S. Nichols, Pineville, N.C., assignor to The BFGoodrich Company, Brecksville, Ohio

Continuation of Ser. No. 134,385, Dec. 17, 1987. This application Mar. 22, 1990, Ser. No. 498,472

Int. Cl.[5] C09K *3/00*

U.S. Cl. 252—182.18 6 Claims

1. A water-dispersed toughening agent composition for castable elastomeric systems, said composition consisting essentially of (1) 100 parts by weight of an amine-containing liquid polymer having an average molecular weight of from about 1000 to about 10,000, (2) at least 25 parts by weight of an organic solvent which is both water and organic soluble and has a normal boiling point above about 100° C., (3) at least about 0.8 carboxyl equivalent of an organic acid for each 1.0 amine equivalent, said acid having a pka value of less than about 5, and (4) from about 50 to about 750 parts by weight of water, wherein said amine-containing liquid polymer is represented by the following general formula:

, YnjB—X

wherein Y is a univalent radical obtained by removing hydrogen from an amine group of an aliphatic, alicyclic, heterocyclic or aromatic amine which has at least two secondary or mixed primary and secondary amine groups; n is an integer from 1 to about 10; x is either Y or a monomeric unit of the polymeric backbone; and B is a polymeric backbone comprising carbon-carbon or carbon-oxygen linkages.

4,988,462

NON-AQUEOUS CLEANING COMPOSITIONS CONTAINING BLEACH AND CAPPED NONIONIC SURFACTANT

Frederik J. Schepers, and Charles C. Verburg, both of Vlaardingen, all of Netherlands, assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Apr. 13, 1989, Ser. No. 337,582

Claims priority, application United Kingdom, Apr. 29, 1988, 8810196; Oct. 14, 1988, 8824109

Int. Cl.[5] C11D *1/722, 7/54, 3/20*

U.S. Cl. 252—174.22 10 Claims

1. A non-aqueous liquid cleaning composition comprising from 10% to 90% by weight of a liquid phase comprising a surfactant, said surfactant consisting essentially of capped nonionic surfactant, from 10% to 90% of a particulate sold phase comprising a persalt bleach dispersed in said liquid phase and the composition containing a precursor for said persalt bleach, the weight ratio of said persalt bleach to said precursor being from 15:1 to 2:1 and the amount of both bleach plus bleach precursor being from 5 to 35% by weight of the composition.

4,988,463

FOAM SUPPRESSANTS

Klaus Walz, Leverkusen, and Karl-Heinz Breyer, Kuerten-Biesfeld, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

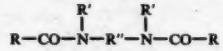
Filed Mar. 13, 1989, Ser. No. 322,441

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810426

Int. Cl.[5] B01D *17/00, 19/04*

U.S. Cl. 252—358 5 Claims

1. A foam suppressant and dearating agent, said agent being free of silicone oil and mineral oil and said agent consisting essentially of (a) an ester of a fatty acid containing 12 to 22 carbon atoms with a monohydric alcohol containing 1 to 4 carbon atoms, a diester of said fatty acid with a diol of 2 to 6 carbon atoms or a synthetic or naturally occurring triester of said fatty acid with glycerol, having a boiling point of at least 150° C. and, based on (a), (b) 0.5–10% by weight of an amide of the formula



(I)

in which

R stands for C_{10}–C_{22}–alkyl or –alkenyl,

R′ stands for H or C_1–C_4–allkyl, or the two R′ together stand for an ethylene bridge, and

R″ stands for the radicals t,0121

or CH_2—O—CH_2—,

wherein

R‴ stands for H, C_1–C_6–alkyl or phenyl, and

(c) 1–30% by weight of a non-ionic surfactant.

4,988,464

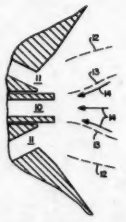
METHOD FOR PRODUCING POWDER BY GAS ATOMIZATION

Michael F. Riley, Danbury, Conn., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Jun. 1, 1989, Ser. No. 359,978

Int. Cl.[5] B29B *9/10*

U.S. Cl. 264—12 18 Claims



1. A method for producing powder comprising:

(A) a forming an axially flowing stream of molten material;

(B) forming a diverging swirling annular stream of gas around and along the molten stream, said gas stream having an angular velocity to axial velocity ratio sufficient to cause some of the gas to flow toward the molten stream in the axially opposite direction from that of the diverging annular gas stream;

(C) contacting the molten stream with the oppositely flowing gas stream thereby causing rapid radial spreading of the molten stream;

(D) contacting the radially spreading molten stream with the diverging annular gas stream causing the molten stream to form droplets; and

(E) solidifying the droplets to form powder.

4,988,465

MANUFACTURE OF MULTILAYER FILM CONTAINING VERY LOW DENSITY POLYETHYLENE

Stanley Lustig, Park Forest, and Jeffrey Schuetz, Woodridge, both of Ill., assignors to Viskase Corporation, Chicago, Ill.

Continuation of Ser. No. 263,947, Oct. 28, 1988, abandoned, which is a continuation of Ser. No. 54,918, May 28, 1987, Pat. No. 4,863,784. This application Jan. 24, 1990, Ser. No. 469,126

Int. Cl.[5] B29C *71/04*

U.S. Cl. 264—22 17 Claims

1. A process of producing a thermoplastic, heat shrinkable, multilayer film suitable for use in packaging fresh red meats and processed meats, which comprises coextruding a core layer comprising a vinylidene chloride-methyl acrylate copolymer having a vinylidene chloride content of from about 85 to about 95 weight percent and a methyl acrylate content of from about 5 to about 15 weight percent all based on the

weight of said copolymer, a first layer adhered directly to one side of said core layer without adhesive material therebetween and comprising very low density polyethylene of density not greater than about 0.915 grams per cubic centimeter, and a second layer adhered directly to the other side of said core layer without adhesive material therebetween and comprising very low density polyethylene of density not greater than about 0.915 grams per cubic centimeter.

4,988,466

METHOD AND AN APPARATUS FOR THE PRODUCTION OF RIBBED PIPES

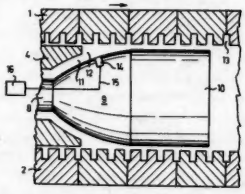
Jyri Järvenkylä, Salpakangas, Finland, assignor to Uponor N.V., Emmaplein, St. Maarten, Netherlands Antilles

PCT No. PCT/FI87/00027, § 371 Date Jul. 28, 1989, § 102(e) Date Jul. 28, 1989, PCT Pub. No. WO88/06087, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 19, 1987, Ser. No. 382,653

Int. Cl.[5] B29C *47/92*

U.S. Cl. 264—40.1 **5 Claims**



1. A method for the production of ribbed pipes, in which method a pressurized plastic material is fed through an extruder **(5)** into a pipe moulding space **(12)** defined by a mandrel **(8** to **10)**, an end face of an extrusion sleeve **(4)** and chill moulds **(1,2)** moving in the direction of the central axis of the mandrel and defining a mould cavity surrounding the extrusion sleeve and the mandrel, the inner face of the chill moulds being provided with annular grooves **(13)**, characterized in that the pressure of the material contained in the moulding space **(12)** is measured, and that the feeding speed of the extruder **(5)** and/or the speed of travel of the chill moulds **(1,2)** is adjusted on the basis of the measured pressure.

3. An apparatus for the production of ribbed pipes, comprising an extruder **(5)** formed by a mandrel **(8,9)** positioned on the central axis of the apparatus, and an extrusion sleeve **(4)** surrounding the mandrel, a ring-shaped nozzle **(11)** being defined by the mandrel and the extrusion sleeve for the feeding of a pressurized plastic material; and corrugating means formed by a mandrel part **(9,10)** positioned outside the extrusion sleeve and chill moulds **(1,2)** surrounding the extrusion sleeve and the mandrel and arranged to move in the direction of the central axis of the mandrel **(8** to **10)**, the chill moulds, an end face of the extrusion sleeve and the mandrel defining therebetween a pipe moulding space **(12)**, characterized in that a pressure sensor **(14)** is attached to the end face of the extrusion sleeve **(4)** defining the pipe moulding space **(12)**, which pressure sensor communicates with a device **(16)** for adjusting the feeding speed of the extruder **(5)** and/or the speed of travel of the chill moulds **(1,2)**.

4,988,467

METHOD OF FORMING HOT MELT GASKETS

Robert S. Holdsworth, Arlington; Shawn E. Brown, N. Cambridge, and Joel A. Gribens, Framingham, all of Mass., assignors to W. R. Grace & Co.-Conn., Lexington, Mass.

Division of Ser. No. 160,628, Feb. 26, 1988, Pat. No. 4,852,754. This application May 30, 1989, Ser. No. 357,930

Int. Cl.[5] B29C *13/02*

U.S. Cl. 264—46.6 **10 Claims**

1. A process forming a hot melt gasket in a polyolefin plastic closure comprising the steps of:

(a) heating a hot melt ethylene vinyl acetate based compound containing a tackifier resin to a temperature above its melting point and lining the compound onto an inner peripheral surface of the plastic closure, and

(b) heating a second hot melt ethylene vinyl acetate based compound containing no tackifier resin to a temperature above its melting point and lining the compound onto the first hot melt compound, and

(c) allowing the first and second hot melt compounds to cool.

4,988,468

METHOD FOR PRODUCING NON-REDUCIBLE DIELECTRIC CERAMIC COMPOSITION

Goro Nishioka; Shuuji Watanabe, and Yukio Sakabe, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jan. 6, 1988, Ser. No. 141,999

Claims priority, application Japan, Jan. 8, 1987, 62-2996; Jan. 8, 1987, 62-2997; Jan. 8, 1987, 62-2998; Jan. 8, 1987, 62-2999; Jan. 8, 1987, 62-3000; Mar. 6, 1987, 62-52602

Int. Cl.[5] C04B *35/46*

U.S. Cl. 264—65 **16 Claims**

1. A method for producing non-reducible dielectric ceramics of the kind comprising a basic composition of a three component system $BaTiO_3$-$CaTiO_3$-$CaZrO_3$ or of a four component system $BaTiO_3$-$CaTiO_3$-$CaZrO_3$-$MgTiO_3$ and containing additives composed of at least manganese oxide and silicon dioxide, the method comprising the steps of

providing separately prepared calcined powders of at least three perovskite compounds including $BaTiO_3$, $CaTiO_3$ and $CaZrO_3$, and when the four component system is being produced also $MgTiO_3$,

mixing said calcined powders to prepare a mixture for a basic composition,

adding additives composed of at least manganese oxide and silicon dioxide to said mixture for the basic composition, and then firing the resultant mixture in a reducing atmosphere.

4,988,469

METHOD OF FABRICATING FIBER REINFORCED COMPOSITE ARTICLES BY RESIN TRANSFER MOLDING

Richard T. Reavely, Madison, and Wonsub Kim, Orange, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 274,099, Nov. 21, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 483,970

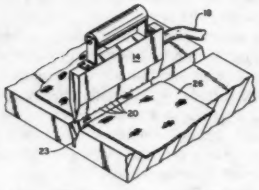
Int. Cl.[5] B29C *43/18, 43/20, 45/02*

U.S. Cl. 264—113 **8 Claims**

1. In a method of fabricating a fiber reinforced composite article including stacking a plurality of dry fabric plies, shaping the plies into the desired shape, and stabilizing said plies to form a dry fiber preform, placing the stabilized dry fiber preform into a resin transfer molding means, injecting a thermosetting resin into the resin transfer molding means under pressure to impregnate said stabilized fiber preform with the thermosetting resin, and heating said stabilized fiber preform and thermosetting resin to cure the thermosetting resin and form

the fiber reinforced article, the improvement in forming the dry fiber preform comprising:

stabilizing the plies by disposing about 5 grams to about 20 grams of polymeric binder per square meter fabric ply surface between each pair of adjacent dry fabric plies, laying up the fabric plies on a shaped perforated mandrel, applying compaction pressure against the fabric plies by a tool having a body fabricated from a low heat conductive



material, wherein the tool is shaped to conform to the mandrel and, while applying said compaction pressure, first passing hot air at a temperature of approximately 250° F. to 400° F. through the tool at air pressure sufficient to penetrate all of the fabric plies and subsequently passing relatively cool air at room temperature or below through the tool at air pressure sufficient to penetrate the fabric plies, whereby the fabric plies form a high density stabilized dry fiber preform.

4,988,470

PROCESS FOR PREPARING STRUCTURES OF INORGANIC FIBER MATERIAL CONTAINING SILICONE RESIN

Ulrich Demlehner, Kastl; Bernward Beubzer, and Matthias Wolfgruber, both of Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemis GmbH, Munich, Fed. Rep. of Germany

Filed May 12, 1989, Ser. No. 350,802

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817332

Int. Cl.[5] C07F *7/00*; B29C *43/18*

U.S. Cl. 264—137 **18 Claims**

1. A process for preparing inorganic fiber structures which comprises impregnating inorganic fiber material with an aqueous emulsion comprising a silicone resin having the formula

$$R_aSi(OR^1)_bO_{\frac{4-a-b}{2}}$$

where R is selected from the group consisting of a methyl and phenyl radical, R^1 is selected from the group consisting of a methyl and ethyl radical, a is 0, 1, 2 or 3, with an average of from 0.8 to 1.5 and b is 0, 1, 2 or 3, with an average of from 0.05 to 0.4 and a viscosity of at least 2000 mPa.s at 25° C., an emulsifier and a curing catalyst selected from the group consisting of salts of trivalent iron and chelates of trivalent iron, shaping the impregnated fiber material and thereafter curing the silicone resin.

4,988,471

APPARATUS AND METHOD OF FORMING A CONTINUOUS LAYER OF THERMOPLASTIC MATERIAL

Eugenio Millevoi, Fort Lee, and Paul S. Brydel, Rockaway, both of N.J., assignors to Sano, Inc., Passaic, N.J.

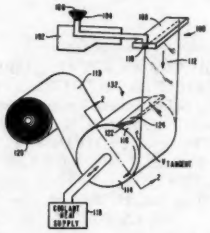
Filed Sep. 15, 1989, Ser. No. 407,898

Int. Cl.[5] B29C *47/88*

U.S. Cl. 264—211.12 **36 Claims**

1. An apparatus for forming a continuous layer of material, said apparatus comprising a movable surface supporting a layer of entrained air, supplying means for supplying a layer of material onto said surface, and deflecting means arranged adjacent said surface proximate the junction of said layer of material and said surface for deflecting said layer of entrained air from said surface to prevent a substantial portion of said layer of entrained air from being trapped between said layer of material and said surface in the absence of an applied vacuum thereat, said deflecting means including a longitudinal member arranged across said surface and having an air deflecting surface arranged at an angle thereto, said member including a leading edge positioned adjacent said surface in a direction facing opposite to the direction of movement of said surface whereby said layer of entrained air is deflected by said leading edge and along said air deflecting surface away from said movable surface.

25. A method of forming a continuous layer of plastic material, said method comprising extruding a layer of plastic mate-



rial onto a moving casting surface supporting a layer of entrained air having an initial tangential velocity and, deflecting said layer of entrained air from said casting surface proximate the junction of the extruded layer of plastic material and said casting surface in the absence of an applied vacuum thereat, whereby the velocity of said layer of air immediately adjacent said junction of the extruded layer of plastic material and said casting surface is less than about 50 percent of said initial tangential velocity, said deflecting comprising arranging a longitudinal member having a leading edge across said casting surface and having an air deflecting surface arranged at an angle thereto, and positioning the leading edge in a direction facing opposite to the direction of movement of the casting surface whereby said layer of entrained air is deflected by said leading edge and along said air deflecting surface away from said movable surface.

4,988,472

METHOD OF INSERTING A PIECE INTO A MOLD FOR MOLDING A MOUTH OF A PREFORM

Hiroyuki Orimoto; Daiichi Aoki, and Yoshiki Miyazawa, all of Komoro, Japan, assignors to Nissei ASB Machine Co., Ltd., Japan

PCT No. PCT/JP88/01112, § 371 Date Jun. 30, 1989, § 102(e) Date Jun. 30, 1989, PCT Pub. No. WO89/03755, PCT Pub. Date May 5, 1989

PCT Filed Oct. 31, 1988, Ser. No. 391,564

Claims priority, application Japan, Oct. 31, 1987, 62-277015

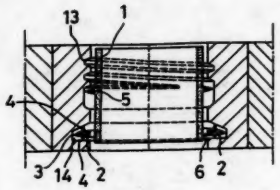
Int. Cl.[5] B29C *39/10*

U.S. Cl. 264—273 **7 Claims**

1. A method for molding a mouth for a container, said method comprises the steps of:

placing an insert piece into a mouth molding mold, said mouth molding mold including a cavity recess for molding a support ring forming part of said mouth, said insert piece including a plurality of spacer projections formed integrally with said insert piece and projecting therefrom at regular intervals about the parameter of said insert piece, said insert piece being placed in said mouth molding mold at a location wherein said spacer projections extend into said cavity recess of said mold and are pressed against

the surface of said cavity recess so as to fixedly hold said insert piece in a predetermined location in said mold; and



pouring a molding material into said mold and around the outside of said insert piece to embed said insert piece inside said molding material.

4,988,473

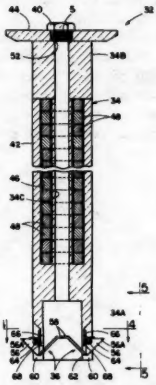
SELF-LATCHING REACTIVITY-REDUCING DEVICE FOR USE IN ON-SITE SPENT FUEL ASSEMBLY STORAGE

Donald E. Mueller, Plum Boro, and William A. Boyd, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 281,148, Dec. 8, 1988, Pat. No. 4,917,856. This application Jan. 17, 1990, Ser. No. 466,521

Int. Cl.[5] G21C *7/06*

U.S. Cl. 376—327 **6 Claims**



1. An arrangement for reducing the reactivity of a spent nuclear fuel assembly to permit placement thereof in a fuel storage facility, said arrangement comprising:

(a) an elongated tool;

(b) a reactivity-reducing device including

(i) an elongated rod being separate from said tool and insertable in a guide thimble of a spent fuel assembly, said rod having leading and trailing ends and containing neutron absorbing material,

(ii) latch means mounted to said leading end of said rod of movement between an outwardly displaced latching position and an inwardly displaced releasing position, and

(iii) means engaged with said latch means for biasing said latch means to said latching position such that said means is not movable from said latching position to said releasing position without the use of said elongated tool,

(iv) said rod having a central passage opening at said trailing end of said rod and extending from said trailing end to said latch means at said leading end of said rod, said central passage from said trailing end of said rod providing the only way for reaching said latch means by said elongated tool for moving said latch means from said latching position to said releasing position; and

(c) means separate from said elongated tool and said reactivity-reducing device and being detachably attachable to said trailing end of said rod for closing said passage therethrough and rendering said latch means at said opposite leading end of said rod inaccessible by said elongated tool from said trailing end of said rod such that said latch means remains at said latching position, said elongated tool being insertable through said passage of said rod upon detaching of said closing means from said rod for engaging and moving said latch means against said biasing means from said latching position to said releasing position.

4,988,474

PROCESS AND HOLDING COMPONENT FOR REPAIR OF A NUCLEAR FUEL ASSEMBLY DAMAGED AT THE PERIPHERY OF A SPACER SUPPORT

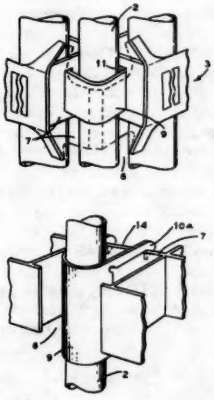
Heinz Hoffmann, Einhausen; Leonhard Knierriem, Erbach, and Franz Pötz, Heppenheim, all of Fed. Rep. of Germany, assignors to ABB Reaktor GmbH, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 373,353

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821666

Int. Cl.[5] G21C *19/00*

U.S. Cl. 376—261 **9 Claims**



8. A method for repairing a nuclear reactor fuel assembly damaged at the periphery of an interim spacer support, the fuel assembly comprised of a bundle of longitudinally extended fuel rods held in position by several grid-shaped spacer supports axially distanced from one another whereby each fuel rod passes through and is elastically supported in a cell of the spacer support which is formed by intersecting metal crosspieces arranged at the edge, the method comprising:

a. removing the damaged portion of a cell of a spacer support;

b. replacing the fuel rod with a dummy fuel rod that does not contain nuclear fuel; and

c. installing a holding component which contacts the dummy fuel rod and is attached to a remaining portion of the cell.

4,988,475

DEVICE FOR CHECKING THE AXIAL RETENTION FORCE ON A PERIPHERAL FUEL ROD OF A FUEL ASSEMBLY OF A NUCLEAR REACTOR

Louis Guironnet, Lyons, France, assignor to Framatome, Courbevoie and Cogema, Velizy Villacoublay, both of, France

Filed Dec. 28, 1989, Ser. No. 458,028
Claims priority, application France, Dec. 28, 1988, 88 17344
Int. Cl.[5] G21C *17/06*
U.S. Cl. 376—248 7 Claims

1. Device for checking the axial retention force on a peripheral rod (6*a*) of a fuel assembly (1) of a nuclear reactor inside the framework of the assembly, comprising a plurality of spacer grids (2) retaining the fuel rods in a uniform network in transverse direction and in the axial direction of the rod (6*a*) by virtue of gripping means (15, 16, 7) associated with the cells of the grid (2) in which the rods (6) are inserted, the checking being performed remotely and under a certain depth of water in a fuel assembly storage pool, by virtue of the device which comprises:

(a) a rod (28) on which is mounted a means (30, 32, 33) for support and displacement which is movable in an axial direction of the rod (28) and in two directions perpendicular to said axial direction;

(b) a device for pushing axially on a longitudinal end of the rod (6*a*) carried by the means (30, 32, 33) for support and displacement, consisting of a fork (64) comprising an end notch (66) for its engagement on a shoulder of an end plug of the rod, said fork being fixed on an element (61) which is movable in the vertical direction in a guide means (60) fixed on the means (30, 32, 33) for support and displacement, and of at least one support fork on a face of a corresponding end joining piece (4, 5) of the fuel assembly, which fork is fixed on the means (30, 32, 33) for support and displacement, the vertical displacement of the movable element being ensured by a remote control means (42, 45);

(c) means (77, 79, 76, 78) for measuring the axial pushing force on the rod (6*a*) and the amplitude of the axial displacement of the rod under the effect of the pushing action, disposed at the upper level of the storage pool (27);

(d) and at least one video camera (34) carried by the means (30, 32, 33) for support and displacement in order to provide an image of the zone in the vicinity of the end of the rod (6*a*) on which a pushing action is being exerted;

wherein the movable element consists of a sliding shaft (61) on which is machined a rack (61') of vertical direction, the remote control means (42, 45) consisting of a ball remote control whose flexible movable element (45) is connected to the end of a rack (47) engaging with a drive pinion (52) driving the displacement of the rack (61') and of the movable element (61) by means of at least one pinion (56, 57).

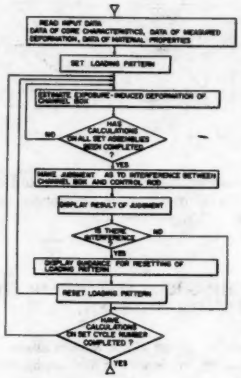
4,988,476

METHOD OF AND APPARATUS FOR EVALUATING DEFORMATION OF CHANNEL BOX OF FUEL ASSEMBLY FOR USE IN NUCLEAR REACTOR

Noriyuki Sadaoka; Hiroki Kumahora, both of Hitachi, and Kazuyoshi Miki, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 7, 1989, Ser. No. 404,344
Claims priority, application Japan, Sep. 9, 1988, 63-224435
Int. Cl.[5] G21C *17/00*
U.S. Cl. 376—245 10 Claims

4. A method of evaluating deformations of channel boxes of fuel assemblies having been used for exposure in a nuclear reactor core, said fuel assemblies being divided in groups each having a predetermined number of said fuel assemblies and including a control rod, comprising the steps of: finding initial


READ INPUT DATA
DATA OF CORE CHARACTERISTICS, DATA OF MEASURED DEFORMATION, DATA OF MATERIAL PROPERTIES
SET LOADING PATTERN
ESTIMATE EXPOSURE-INDUCED DEFORMATION OF CHANNEL BOX
HAS CALCULATIONS ON ALL SET ASSEMBLIES BEEN COMPLETED ?
NO
YES
MAKE JUDGMENT AS TO INTERFERENCE BETWEEN CHANNEL BOX AND CONTROL ROD
DISPLAY RESULT OF JUDGMENT
IS THERE INTERFERENCE ?
NO
YES
DISPLAY GUIDANCE FOR RESETTING OF LOADING PATTERN
RESET LOADING PATTERN
HAVE CALCULATIONS ON SET CYCLE NUMBER COMPLETED ?
YES

deformations of said channel boxes; reading data of core characteristics, data of material properties and shapes of said channel boxes, data of positions of said channel boxes and said control rods, data of loading patterns and said initial deformations; calculating estimated deformations of channel boxes in a next exposure cycle from said read data; judging whether or not said channel boxes interfere with said associated control rods in accordance with said estimated deformations; displaying results of the interference; resetting loading positions, loading directions and a loading pattern causing no interference, if interference is estimated to occur; and displaying said reset loading positions, directions and pattern.

4,988,477

AN INJECTION-BLOW MOLDING METHOD FOR MANUFACTURING A COLORED POLYESTER CONTAINER

Richard F. T. Bes, and Jan D. Knol, both of Apeldoorn, Netherlands, assignors to Holland Colours Apeldoorn B. V., Netherlands

Filed Sep. 28, 1988, Ser. No. 250,350
Claims priority, application Netherlands, Sep. 28, 1987, 8702312
Int. Cl.[5] B29C *49/06*
U.S. Cl. 264—537 1 Claim

1. A method for producing a colored polyester container, comprising:

pretreating a colorless, granular polyethylene terephthalate material stream, the pretreatment comprising heating the polyethylene terephthalate stream to a temperature of 150° to 170° C.;

introducing a separate, particulate dyestuff composition stream to a cooled feeder, the dyestuff composition stream consisting of an intimate mixture of a dyestuff and/or pigment and a wax-like carrier, and cooling the feeder to

thereby hold the dyestuff composition stream at a temperature below the melting point of the wax-like carrier and thereby preventing the high temperature of the polyethylene terephthalate stream from being communicated to the dyestuff composition stream until the dyestuff composition stream is mixed with the colorless, granular polyethylene terephthalate stream;

mixing the polyethylene terephthalate stream and the cooled dyestuff composition stream to form a mixed stream;

feeding the mixed stream to an injection molding apparatus;

injection molding a colored preform from the mixed stream; and

blow molding the colored preform into a final shape.

4,988,478

PROCESS FOR FABRICATING PROCESSED WOOD MATERIAL PANELS

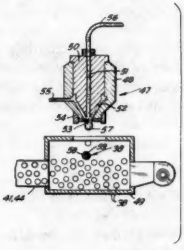
Kurt Held, Alte Str. 1, D-7218 Trossingen 2, Fed. Rep. of Germany

Filed Dec. 16, 1988, Ser. No. 285,773

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742652

Int. Cl.[5] B30B *5/06*

U.S. Cl. 264—518 **26 Claims**



1. Process of fabricating processed wood material panels, such as chip boards, fiber boards, OSB panels, MDF panels, and the like with processed wood material bonded together with a duroplastic binder, in which the curing of the panel is accelerated by a hardener, the process including the steps of spreading processed wood material particles and binder in the form of a fleece on a conveyor, transporting the fleece on the conveyor to a continuously operating double-band press, compacting the fleece in the double-band press and in the compacting step reducing the fleece thickness from an original thickness to a final thickness, and then pressing the final thickness of the fleece with an applied pressure, and introducing hardener into the fleece, wherein the improvement comprises the steps of introducing the binder free of hardener into the material particles, encapsulating an acid or basic hardener in a gaseous phase or a binary phase with a gaseous carrier agent in microcapsules having an enclosing wall with the enclosing wall being inert relative to the binder, introducing the hardener containing microcapsules into the wood material particles and binder during the period covering when the wood particle material and binder is spread to form the fleece and up to the commencement of the reduction of the thickness of the fleece from the original thickness, transporting the fleece after the introduction of the hardener to a wedge-shaped inlet of the double-band press, compacting the fleece in the wedge-shaped inlet from the original thickness to the final thickness, and destroying the enclosing wall of the microcapsules during the compacting step and releasing the hardener into the fleece for commencing the hardening action and after passage of the fleece through the wedge shaped inlet, pressing the fleece in an average pressure reaction zone followed by a low pressure shape maintenance zone within the double-band press.

4,988,479

METHOD FOR PRODUCING A COMPOSITE MATERIAL

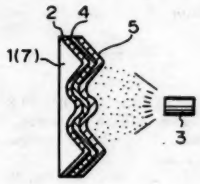
Ryuji Nishikawa; Hideya Takahashi, and Norio Shinoda, all of Shizuoka, Japan, assignors to Yamaha Corporation, Japan

Filed Oct. 4, 1989, Ser. No. 416,844

Claims priority, application Japan, Oct. 6, 1988, 63-252667; Oct. 6, 1988, 63-252668; Dec. 13, 1988, 63-314674

Int. Cl.[5] B22F *7/00*

U.S. Cl. 419—8 **19 Claims**



1. A method for producing a composite material, comprising the steps of:

forming at least one surface layer on an elongated core forming a base block made of Ti-base material by spraying on the core different component materials to obtain a crude composite material which forms an intermediate layer on the core;

applying pressure to said crude composite material; and

bonding a sheet made of Ni-base material to said intermediate layer by cladding.

4,988,480

METHOD FOR MAKING A COMPOSITE

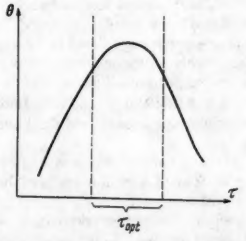
Alexandr G. Merzhanov; Inna P. Borovinskaya, both of ulitsa Tretya, 3, kv. 2, Moskovskaya oblast, poselok Chernogolovka, U.S.S.R.; Alexandr N. Pitjulin, ulitsa Pervaya, 2a, kv. 26, Moskovskaya oblast, Chermogolovka, U.S.S.R.; Viktor I. Ratnikov, ulitsa Tsentralnaya, 6, kv. 41, Moskovskaya oblast, Chermogolovka, U.S.S.R.; Konstantin L. Epishin, proezd Stroitelei, 1b, komnate 334, Moskovskaya oblast, Chernogolovka, U.S.S.R., and Vadim L. Kvanin, ulitsa Oxkaya, 42/1, korpus 1, kv. 42, Moscow, U.S.S.R.

PCT No. PCT/FR88/00270, § 371 Date Aug. 23, 1990, § 102(e) Date Aug. 23, 1990, PCT Pub. No. WO90/07014, PCT Pub. Date Jun. 28, 1990

PCT Filed Dec. 20, 1988, Ser. No. 566,358

Int. Cl.[5] B22F *00/00*

U.S. Cl. 419—11 **19 Claims**



1. A method for making a composite, comprising blending a mixture containing at least one metallic element of groups III–VI, VIII of the periodic table of the chemical elements and at least one compound of at least one of the elements of said groups taken individually or in combination, at least one non-metallic element of groups III–VI of the periodic table of the chemical elements and at least one compound of at least one of the elements of said groups taken individually or in combina-

tion, and a binder component, compacting the mixture, placing the mixture into a synthesis zone, igniting the mixture with subsequent reaction of the components of the mixture under combustion conditions, and compacting the hot combustion products to obtain an end composite, characterized in that after ignition the mixture is cured till compaction of hot products during a period ranging from about 0.1 seconds to about 0.5 hours, and compacting the hot combustion products is carried out under pressure at an average rate of pressure rise ranging from about 10 to about 2000 kgf/cm^2-s, with subsequent cure of the compacted product under isobaric conditions to complete homogenization of the composite and subsequent cooling.

4,988,481

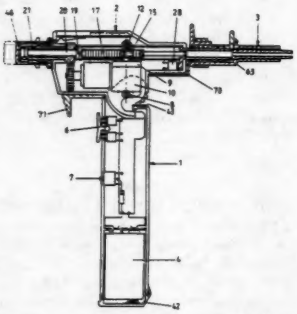
ELECTRICAL PIPETTE

Kari Jarvimaki, Espoo; Mauno Heinonen, Vantaa, and Juha Koivisto, Helsinki, all of Finland, assignors to Labsystems OY, Helsinki, Finland

Filed Jan. 30, 1989, Ser. No. 304,065

Int. Cl.[5] B01L *3/02*

U.S. Cl. 422—100 **15 Claims**



1. An electrical pipette, comprising a body member having lower and upper portions, a cylinder assembly and a piston disposed within said cylinder assembly extending downwardly from said body member, said cylinder assembly being coupled to said lower portion of said body member, a toothed rack movably mounted within said body member and capable of reciprocal longitudinal movement therein, one end of said rack being provided with means operatively coupling said end to said piston, a first and second limiter disposed within said body member to limit the reciprocal movement of said rack to two limiting positions, said second limiter being disposed at said lower portion of said body member, and said first limiter being disposed in said upper portion of said body member, said first limiter being adjustably positioned in said upper portion of said body member for respectively limiting the reciprocal movement of said rack in a first and second direction corresponding respectively to intake and discharge of fluid into and from said cylinder assembly,

an electric motor located within said body member having an output shaft with a pinion cooperably and drivingly associated with said rack,

stopping means for stopping said motor when said rack comes to one of the two limiting position of the reciprocal movement, said stopping means comprising a conductive piece in each of said limiters, a conductive ram in said rack which contacts one of said conductive pieces when the rack comes to one of the limiters in its reciprocal movement,

an electrical circuit comprising said conductive pieces and said ram for stopping said motor when contact takes place at a limiter,

an externally operable bidirectional switch cooperably associated with said body member for operating said motor,

a threaded limiter-actuating shaft joined to said first limiter and being longitudinally movable to position or index said first limiter said button having a skirt at the lower end thereof, said threaded limiter-actuating shaft being oriented with its longitudinal axis parallel to the axis of said rack and passing through a means defining an opening in the body member in threading engagement with a threaded nut knob mounted on the limiter-actuating shaft at the upper portion of the body member for rotation in the means defining the opening in the body member,

said nut knob being externally manipulable for threadedly adjusting the longitudinal position of the first limiter, said nut knob being provided with nut locking means for releasably locking said nut knob to prevent accidental adjustment,

said nut locking means comprising a cylindrical covering button surrounding the nut knob, said covering button having a skirt at the lower end thereof, said covering button having a first and second position, in which said first position the covering button is freely rotatable around the nut knob and in said second position the covering button is joined to the nut knob so that rotating the covering button will also rotate the nub knob,

signal transmitting means cooperably associated with said body member operatively coupled to said nut for providing a signal indicative of the position of said threaded shaft, and

an externally readable volume indicating means mounted on an external surface of said body member coupled responsively to said transmitting means for indicating the volume intake setting of said pipette as determined by adjustment of said nut knob.

4,988,482

METHOD AND APPARATUS FOR CHEMICAL ANALYSIS

Terence E. Weston, Woodbridge, England, assignor to Microvol Limited, Ipswich, England

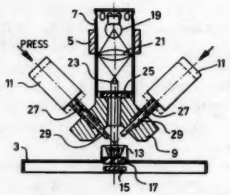
PCT No. PCT/GB87/00704, § 371 Date Jun. 1, 1988, § 102(e) Date Jun. 1, 1988, PCT Pub. No. WO88/02865, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 5, 1987, Ser. No. 203,086

Claims priority, application United Kingdom, Oct. 7, 1986, 8624064

Int. Cl.[5] G01N *35/00;* **B01L** *3/02*

U.S. Cl. 422—100 **8 Claims**



1. Apparatus for performing chemical analysis comprising in combination:

sample holding means to hold a sample to be analyzed,

a 1 shot metering dispenser having a reagent reservoir constantly pressurized by a gas also within said reservoir and a reagent discharge tube,

support means supporting the dispenser in a manner allowing relative movement between the reservoir and the discharge tube, whereby liquid released by the dispenser is delivered to the sample holding means when the latter is in a predetermined position, and means for detecting a change in a predetermined property of a sample, wherein the reservoir and discharge tube are relatively moveable

with unidirectional operating and return strokes to deliver a predetermined amount of reagent from said reservoir to the sample holding means as a result of each operating stroke.

4,988,483

EXHAUST GAS CLEANING APPARATUS

Masayoshi Usui, Numazu, and Haruo Serizawa, Shizuoka, both of Japan, assignors to Usui Kokusai Sangyo Kabushiki Kaisha, Japan

Filed Nov. 27, 1989, Ser. No. 441,585

Claims priority, application Japan, Nov. 30, 1988, 63-154940[U]

Int. Cl.[5] B01J *8/02*

U.S. Cl. 422—180 8 Claims

1. An exhaust gas cleaning apparatus comprising: a honeycomb core body adapted for carrying thereon an exhaust gas cleaning catalyst and composed of a sheet-like band made of a thin metal sheet and a corrugated band made from another thin metal sheet, said sheet-like band and said corrugated band being superposed one over the other in a spiral or laminate form defining many network-patterned gas flow passages along the central axis thereof; a tubular metal casing opening at opposite ends, said honeycomb core body being inserted in and fixed to said tubular metal casing; and said honeycomb core body having a recess in its outer peripheral surface except a pair of marginal portions thereof contiguous to opposite ends of said honeycomb core body, said outer peripheral surface of said honeycomb core body being kept out of contact with an inner surface of said tubular metal casing at said recess.

4,988,484

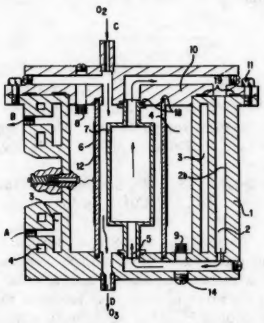
HIGH EFFICIENCY OZONE GENERATOR FOR STERILIZING, BLEACHING AND THE LIKE

Eskil L. Karlson, 4634 State St., Erie, Pa. 16509

Continuation of Ser. No. 155,067, Jan. 29, 1988, abandoned. This application May 7, 1990, Ser. No. 518,313

Int. Cl.[5] B01J *19/08, 19/12*

U.S. Cl. 422—186.19 16 Claims



1. An ozone generator comprising first and second electrodes spaced from each other, means for establishing a corona discharge from the first electrode to the second electrode, means for flowing oxygen or an oxygen containing gas at a pressure of 250 to 10,000 psia through said corona discharge area, a first hermetically sealed chamber filled with a first cooling fluid in pressure and heat exchange relation to said first electrode, a second hermetically sealed chamber filled with a second cooling fluid in pressure and heat exchange relation to said second electrode, and flexible barrier means for equalizing or balancing the pressures of the internal cooling fluids and the input gas.

4,988,485

DEVICE FOR CLEANING AND DISINFECTING MEDICAL AND SURGICAL INSTRUMENTS

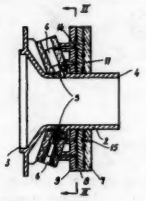
Pierre-Yves Bene, 47, Boulevard des Belges, 69006 Lyon, France

Filed Jan. 23, 1990, Ser. No. 468,098

Claims priority, application France, Jan. 20, 1989, 89 01306

Int. Cl.[5] A61L *2/16*

U.S. Cl. 422—292 14 Claims



1. A device for cleaning and disinfecting medical and surgical instruments, comprising:

a tubular body, one end of which is open and the other end of which is open for passage of fluid into a collection container for waste liquid, the body having an interior wall and a longitudinal axis,

a plurality of nozzles fitted on the interior wall for supplying atomized disinfection liquid within the tubular body,

each said nozzle having an injector in fluid communication with the nozzle for supplying disinfection liquid and pressurized air to the nozzle,

means for supplying pressurized air to the injectors comprising an annular first duct extending through 360° around the tubular body in a plane transverse to the longitudinal axis of the tubular body and means for providing fluid communication between the first duct and the injectors,

means for supplying disinfection liquid to the injectors comprising an arcuate second duct extending 180° about the tubular body in a plane transverse to the longitudinal axis of the body, a fluid inlet located centrally of the ends of said second duct, a third duct comprising two arcuate sections, each section extending 90° about the longitudinal axis of the tubular body in a transverse plane spaced longitudinally from the plane of the second duct, means for providing fluid communication between each end of the second duct and a respective fluid inlet located centrally of the ends of each said section of the third duct; and means for providing fluid communication between each end of the two arcuate sections of the third duct and an associated one of the injectors.

4,988,486

HYDROGEN GENERATOR

William G. Harris, Seattle, and Douglas J. Silva, Kent, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 50,447, May 18, 1987, Pat. No. 4,842,844, which is a division of Ser. No. 761,995, Aug. 2, 1985, Pat. No. 4,753,779. This application Jan. 11, 1988, Ser. No. 142,609

Int. Cl.[5] B01T *8/04*

U.S. Cl. 422—191 20 Claims

1. A reactor for generating hydrogen, comprising;

(a) a reactor jacket;

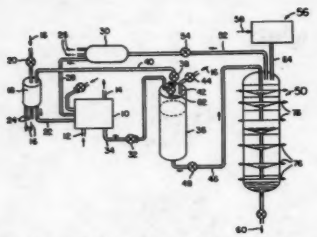
(b) a first vessel, positioned in the reactor jacket, for holding a first bed of consumable metal particles on a distributor plate, the vessel having a bottom;

(c) means for introducing an HCl solution to the vessel through the distributor plate so that the solution flows upwardly counter to gravity through the first vessel;

(d) first active cooling means, positioned below the distributor plate in fluid contact with the bottom of the vessel, for cooling the vessel, and thereby, controlling the temperature of the solution and the rate of reaction between the HCl solution and metal particles to produce hydrogen, the

cooling means having an inlet and outlet in the reactor jacket;

(e) means for collecting the hydrogen produced in the vessel; and



(f) means for collecting the solution emerging from the vessel, the solution collecting means including a funnel substantially spanning across the reactor jacket, the funnel having slated, converging walls for directing the collected solution under gravity flow to a substantially central downcomer port.

4,988,487

PROCESS FOR RECOVERING METAL VALUES SUCH AS SCANDIUM, IRON AND MANGANESE FROM AN INDUSTRIAL WASTE SLUDGE

Wen-Chao Lai, Westboro; William J. Rourke, Worcester, and Samuel Natansohn, Sharon, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 24, 1989, Ser. No. 426,624

Int. Cl.[5] C01F *17/00*; C22B *3/00, 47/00, 61/00*

U.S. Cl. 423—21.5 **8 Claims**

1. A process comprising:

(a) contacting a solid waste material containing metal values that comprise at least tungsten, iron, scandium and manganese and at least one other metal value which metal is selected from the group consisting of Group III metals, cobalt, nickel and rare earth metals and, optionally other refractory metals selected from this group consisting of tantalum and niobium and mixtures thereof and silicon with an acid solution having a normality of about 0.5 to 1.5 containing a reducing agent for conversion of any tetravalent manganese to divalent manganese for a sufficient time at ambient temperature to form a first aqueous acidic leachate containing a major portion of scandium, manganese, divalent iron and a first solid residue containing said tungsten, the remaining iron and if present said other refractory metals,

(b) separating said first aqueous leachate and said first solid residue,

(c) leaching said first solid residue with sufficient hydrochloric acid for a sufficient time to form a second aqueous acidic leachate containing essentially all of said remaining iron as ferric chloride and a second solid residue containing said tungsten and, if present, said other refractory metals,

(d) digesting said second solid residue with an alkali metal base for a sufficient time and at a sufficient temperature to form a first digested solution containing the tungsten and a second solid residue, containing, if present, said other refractory metals,

(e) contacting said first acidic leachate after adjusting the pH to about 1.8 to 2.2 with an iminodiacetic acid cationic ion exchange resin to retain a major portion of said scandium on said resin and forming an aqueous raffinate containing said manganese and divalent iron, and said other metal value,

(f) eluting essentially all of said scandium from said resin by an aqueous solution of a chelating agent to form an aqueous elution solution containing said scandium,

(g) adding a precipitating agent to said elution solution to form a solid scandium compound phase and a first aqueous solution phase that is essentially free of metal values,

(h) separating said scandium compound and said aqueous phase,

(i) adding a sufficient amount of an alkali metal base to said raffinate to form a solid phase containing said other metal value and a second aqueous phase containing said divalent iron and manganese while maintaining the pH in said raffinate of below about 7.5,

(j) separating said second aqueous phase and said solid phase,

(k) reacting an aqueous mixture of an alkali metal base and an oxidant with said second aqueous phase at a pH of from about 3 to about 5 to yield a solid containing said iron in a goethite form and a third aqueous phase containing said manganese,

(l) separating said solid containing said iron and said third aqueous phase containing said manganese,

(m) oxidizing said third aqueous phase containing said manganese at a pH of from about 8 to about 10 in the presence of a base to form solid manganese hydroxide and a fourth aqueous phase that is essentially depleted of metal values, and

(n) separating said solid and said fourth aqueous phase.

4,988,488

IRON ALUMINIDES AND NICKEL ALUMINIDES AS MATERIALS FOR CHEMICAL AIR SEPARATION

Doohee Kang, Macungie, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 19, 1989, Ser. No. 423,832

Int. Cl.[5] C01B *13/02*

U.S. Cl. 423—210.5 **8 Claims**

1. In a process for separating oxygen from nitrogen in air by contacting air with a molten solution of alkali metal nitrates and nitrites to selectively absorb oxygen to produce a nitrogen-enriched gas and separately releasing the absorbed oxygen to regenerate the molten solution and to produce an oxygen-enriched gas the improvement comprising conducting the process in containment of an intermetallic alloy of at least 28 atomic percent aluminum and another metal selected from the group consisting of nickel, iron and mixtures thereof wherein the intermetallic alloy contains an effective quantity of boron up to approximately 0.1 atomic percent to increase ductility of the alloy.

4,988,489

RECOVERY OF PHOSPHORUS VALUES FROM WASTE PHOSPHORIC ACID LIQUORS

Lanny E. Todd, 7629 Indian Springs Dr., Nashville, Tenn. 37221, and Alec F. Bridges, 5007 Criddle Dr., Columbia, Tenn. 38401

Filed Jan. 25, 1989, Ser. No. 302,156

Int. Cl.[5] C01B *25/16*

U.S. Cl. 423—321 R **20 Claims**

1. A process for purifying waste phosphoric acid containing alkyl phosphate esters comprising hydrolyzing the alkyl phosphate esters at a temperature and for a time sufficient to effect hydrolysis to form phosphoric acid and alcohol and separating the so formed alcohol from the phosphoric acid.

4,988,490

ADSORPTIVE PROCESS FOR RECOVERING NITROGEN FROM FLUE GAS

David M. Nicholas, New Tripoli; Joseph P. Bushinsky; Ravi Kumar, both of Allentown, and Wilbur C. Kratz, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

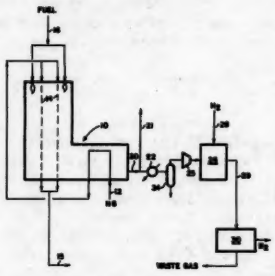
Filed Sep. 14, 1988, Ser. No. 244,429

Int. Cl.[5] C01B *21/00*

U.S. Cl. 423—351 **7 Claims**

1. The method for recovering contained nitrogen from flue

gas obtained in combustion of hydrocarbon fuel, which method comprises the steps of cooling the hot flue gas discharged from said combustion to effect condensation of contained water, separating out the liquid condensate, compressing the remaining vapor and subjecting said vapor to deoxy-



genation by reaction with hydrogen to convert residual-free oxygen therein to water, and subjecting the deoxygenated vapor to pressure swing adsorption for removal therefrom of contained contaminants including CO_2 and water with resulting production and recovery of substantially pure nitrogen.

4,988,491

FLEXIBLE INTEGRATION OF THE PRODUCTION OF AMMONIA AND UREA

Christiaan Van Dijk, 10722 Glenway, Houston, Tex. 77070, and Lowell D. Fraley, 703 Santa Maria, Sugarland, Tex. 77478

Filed Apr. 11, 1989, Ser. No. 336,658
Int. Cl.[5] G01C *1/04, 273/04, 273/10*
U.S. Cl. 423—359 **23 Claims**

1. A process for the flexible manufacture of ammonia and urea which comprises:

adiabatically reforming a carbonaceous feedstock in a reformer with an oxygen containing gas in the preparation of an ammonia synthesis gas;

introducing nitrogen gas to produce an ammonia synthesis gas which consists of hydrogen, nitrogen, traces of ammonia, methane and argon;

said argon in said carbonaceous feedstock, oxygen containing gas and nitrogen being less than 0.2% by volume of those combined feedstock gases;

removing a purge stream from the effluent of the ammonia reactor; and

recycling most of said purge stream to said adiabatic reformer.

23. A process for the flexible manufacture of ammonia and urea which comprises:

adiabatically reforming a carbonaceous feedstock in a reformer with an oxygen containing gas in the preparation of an ammonia synthesis gas;

treating the effluent gas stream from said adiabatic reformer in a watergas shift unit;

extracting a part of the carbon dioxide from the raw ammonia synthesis gas;

reacting the remaining carbon dioxide in the raw ammonia synthesis gas with aqueous ammonia to form a solution containing the reaction product of ammonia and carbon dioxide;

introducing said raw ammonia synthesis gas into an ammonia synthesis loop containing an ammonia reactor;

washing the effluent from said ammonia reactor with an aqueous ammonia stream for removing ammonia as an aqueous solution; and

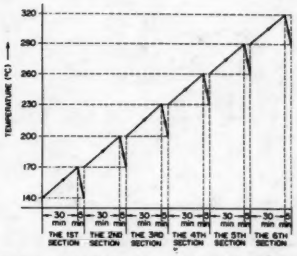
using said solution containing the reactor product of ammonia and carbon dioxide and said aqueous ammonia solution in the production of urea.

4,988,492

METHOD FOR INFUSIBILIZING PITCH FIBERS

Yojiro Hara; Shinzo Ishikawa; Hiroaki Shono, all of Fukushima, and Taiji Matsumoto, Chiba, all of Japan, assignors to Nitto Boseki Co., Ltd., Fukushima and Kawasaki Steel Corporation, Kobe, both of, Japan

Continuation of Ser. No. 247,513, Sep. 22, 1988, abandoned. This application Mar. 21, 1990, Ser. No. 497,774
Claims priority, application Japan, Sep. 28, 1987, 62-240986; Aug. 29, 1988, 63-214569
Int. Cl.[5] D01F *9/12*
U.S. Cl. 423—447.4 **5 Claims**



1. A method for infusibilization of pitch fibers for production of carbon fibers which comprises putting pitch fibers prepared by melt spinning from a spinning pitch in containers, introducing in succession the containers containing the pitch fibers into an infuxibilizing furnace divided into a plurality of sections and passing the containers therethrough from inlet to outlet wherein the containers containing the pitch fibers are intermittently moved through the infusibilizing furnace to retain each of the containers in respective sections for a given period of time, during which temperature in each of the respective sections is independently raised form a minimum controlled temperature to a maximum controlled temperature and thereafter is lowered to the minimum controlled temperature, wherein the difference between the maximum controlled temperature and the minimum controlled temperature in each of the respective sections is set to be a temperature not less than 5° C. and the rising and the lowering of the temperature occurs once per section, and then the container is moved.

4,988,493

PROCESS FOR PRODUCING IMPROVED CARBON BLACKS

Don T. Norman, Houston, and Gary L. Marney, Dumas, both of Tex., assignors to Witco Corporation, New York, N.Y.

Filed Nov. 4, 1987, Ser. No. 117,021
Int. Cl.[5] C01B *31/02;* C09C *1/48*
U.S. Cl. 423—450 **16 Claims**

1. A process for producing carbon black in a reactor vessel utilizing combustion gases and feedstock oil, said process comprising: supplying a linear, substantially non-swirling flow of combustion gases into a feedstock oil injection zone in said reactor, supplying at least two independently controlled streams of carbon black feedstock oil into separate segments of said flow of combustion gases in said feedstock oil injection zone wherein separate carbon black forming reactions are respectively effected in separate segments of said flow of combustion gases, and immediately thereafter supplying said combustion gas segments in which said separate carbon black forming reactions have been effected into an aggregate-forming zone whereby a carbon black product is produced which, when compounded in rubber compositions, provides said rubber compositions with improved hysteresis loss and treadwear resistance properties.

4,988,494

PROCESS FOR RECOVERING SULFUR FROM SULFUR-CONTAINING GASES

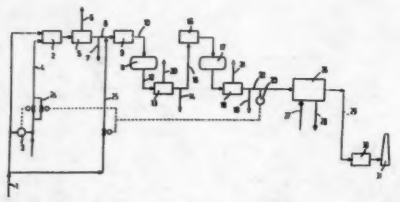
Jan A. Lagas, Monnickendam; Johannes Borsboom, Rijswijk; Pieter H. Berben, Zeist, and John W. Geus, Bilthoven, all of Netherlands, assignors to VEG-Gasinstituut N.V. and Comprino, B.V., both of, Netherlands

Filed Apr. 13, 1987, Ser. No. 37,954

Claims priority, application Netherlands, Apr. 16, 1986, 8600960

Int. Cl.[5] C01B *17/04*

U.S. Cl. 423—574 R 14 Claims



1. A process for the recovery of sulfur from a hydrogen sulfide containing gas, which comprises:

oxidizing hydrogen sulfide in a gaseous stream with oxygen in an oxidation stage;

reacting the product gas of this oxidation further in at least two catalytic stages, in accordance with the equation:

$$2\,H_2S+SO_2 \xrightarrow[\text{concentration}]{} 2\,H_2O+3/n\,S_n$$ the H_2S

in the gas leaving the last of said at least two catalytic stages being controlled to have a value ranging between 0.8 and 3% by volume by employing at least one of the steps a and b:

(a) reducing the quantity of combustion or oxidation air passed to the oxidation stage;

(b) causing a portion of the hydrogen sulfide containing feedstock gas to bypass the oxidation stage and to be added to the gas flowing to one of said at least two catalytic stages; and finally,

selectively oxidizing H_2S in the gas leaving the last of said at least two catalytic stages to sulfur, employing for this purpose a catalytic stage including a selective oxidation catalyst which is substantially insensitive to the presence of water vapor in the gas stream, is ineffective in promoting establishment of the equilibrium

$$2/H_2S+SO_2 \rightleftharpoons 2/H_2O+3/n\,S_n$$ and

is effective to promote oxidation of H_2S to sulfur in the presence of water vapor;

said step of selectively oxidizing also employing an excess of oxygen compared to stoichiometric oxidation, this excess of oxygen being sufficient to result in an overall excess of oxygen being employed in the total process for the recovery of sulfur from the hydrogen sulfide-containing gas.

4,988,495

PROCESS FOR THE RECORVERY OF SULPHURIC ACID IN THE PRODUCTION OF TITANIUM DIOXIDE

Gerhard Wiederhöft, Krefeld, Fed. Rep. of Germany; Eckhard Bayer, Pittsburgh, Pa.; Wolfgang D. Müller, and Günter Lailach, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 15, 1989, Ser. No. 451,267

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843846

Int. Cl.[5] C01G *23/53*

U.S. Cl. 423—616 3 Claims

1. A process for the preparation of TiO_2 pigments comprising hydrolyzing titanyl sulphate, isolating an hydrolysis product from waste acid produced in the hydrolysis, washing the hydrolysis product and calcining the hydrolysis product with formation of TiO_2 pigments, the improvement comprising carrying out the hydrolysis of the titanyl sulphate with the use of hydrolysis nuclei which have been produced separately by reaction of titanium salts with alkaline reagents, and adding waste acid and/or wash liquid containing said waste acid to the hydrolysis of the titanyl sulphate after at least 50% of the total duration of the hydrolysis process have elapsed.

4,988,496

METAL RADIONUCLIDE CHELATING COMPOUNDS FOR IMPROVED CHELATION KINETICS

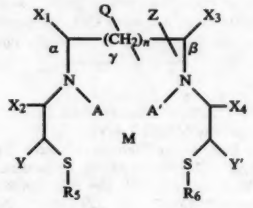
Ananthachari Srinivasan, Kirkland; Alan R. Fritzberg, Edmonds, and David S. Jones, Seattle, all of Wash., assignors to NeoRx Corporation, Seattle, Wash.

Filed May 31, 1988, Ser. No. 201,134

Int. Cl.[5] A61K *49/02*; C07F *13/00*

U.S. Cl. 424—1.1 13 Claims

1. A metal chelate having the formula:



wherein:

M is a metal, or metal oxide, radionuclide which is chelated;

X_1 and X_2 are H or =O, but both are not =O;

X_3 and X_4 are H or =O, but both are not =O;

A is H, alkyl group of C_6 or less, $—CH_2—CH_2—S—R_1$, or $—CO—CH_2—S—R_1$, with the proviso that when X_1 or X_2 is =O, A is H;

A′ is H, alkyl group of C_6 or less, $—CH_2—CH_2—S—R_2$, or $—CO—CH_2—S—R_2$, with the proviso that when X_3 or X_4 is =O, A′ is H;

Y is

(a) $—CH_2—S—R_3$, or H, when A is H or an alkyl group of C_6 or less and A′is H or an alkyl group of C_6 or less, or

(b) H, with the proviso that Y must be selected from (a) when A is H or an alkyl group of C_6 or less and A′ is H or an alkyl group of C_6 or less;

Y′ is

(a) $—CH_2—S—R_4$, or H, when A is H or an alkyl group of C_6 or less and A′ is H or an alkyl group of C_6 or less, with the proviso that Y and Y′ are not both H, or

(b) H, with the proviso that Y′ must be selected from (a) when A is H or an alkyl group of C_6 or less and A′ is H or an alkyl group of C_6 or less;

R_1, R_2, R_3, R_4, R_5, and R_6 are independently selected from sulfur protecting groups;

Q is H or a polar group to increase the hydrophilicity of the compound;

n is 0 to 2; and

z is $—(W)_m—R'$, where W is $—CH_2—$, $—CH_2—O—$, $—CH_2—CO—$, or combinations thereof, m is 0 to 5, and R′is a chemically reactive group, with the provisos that when Z is attached to the carbon designated α there is either no X_1 or no Q at α, that when Z is attached to the carbon designated β there is either no X_3 or no Q at β, that when X_1 is =O there is no Z at β, and that when X_3 is =O there is no Z at β.

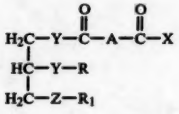
4,988,497

PROCESS FOR THE OPTICAL DETERMINATION OF LIPASE

Ulrich Neumann, Peissenberg/Obb.; Martina Junius, Bernried, and Hans-Georg Batz, Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Fed. Rep. of Germany

Division of Ser. No. 858,349, May 1, 1986, Pat. No. 4,847,376.
This application May 17, 1989, Ser. No. 353,098
Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3516001
Int. Cl.[5] G01N *33/15, 1/00, 33/48;* C12Q *1/44*
U.S. Cl. 424—7.1 8 Claims

1. A reagent for the optical determination of lipase, comprising an effective amount of the lipase substrate of the formula,



wherein A is a C_1–C_{16} alkylene or C_1–C_{16} alkenylene, R and R_1, which can be the same or different, are an alkyl, alkenyl or acyl containing up to 20 carbon atoms or an optionally alkyl-substituted aryl or aralkyl radical containing up to 8 carbon atoms in the alkyl moiety and wherein one of R and R_1 can also be hydrogen, X is an aromatic hydroxy or thiol residue selected from the group consisting of resorufin, chlorphenol red, inodoxyl and thiofluorescein and each Y, independently from each other, is —S—or —O—, and each Z independently from each other is —S—, —O—or —CH_2—and

further comprising a buffer substance, a salt of a bile acid, an alkali metal salt, colipase, urea and/or a chromogenic coupler.

4,988,498

ORAL COMPOSITIONS

Kenneth A. Evans, Chalfont St. Peter; Paul I. Biley, and Brian Rossall, both of Bebington, all of Great Britain, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Jul. 27, 1989, Ser. No. 386,334
Int. Cl.[5] A61K *7/16, 7/18*
U.S. Cl. 424—52 3 Claims

1. An oral composition consisting essentially of 0.1–2% by weight of sodium monofluorophosphate, 0.02–5% by weight of a water-soluble zinc compound and from 20–70% by weight of an unmilled precipitated alumina trihydrate with an average particle size of between 3 and 15 microns.

4,988,499

ORAL COMPOSITIONS

Neil J. Bristow, New South Wales, Australia; Peter Carter, Burton; Bryony E. Coulson, Port Sunlight, and Michael A. Trevethan, Bebington, all of Great Britain, assignors to Unilever Patent Holdings, B.V., Rotterdam, Netherlands

Filed May 19, 1989, Ser. No. 354,659
Claims priority, application United Kingdom, May 19, 1988, 8811828
Int. Cl.[5] A61K *9/16, 9/18*
U.S. Cl. 424—52 4 Claims

1. An oral composition in the form of an aqueous toothpaste for combating dental caries, comprising from about 50 to about 5,000 ppm of a fluoride-containing anti-caries agent selected from the group consisting of sodium fluoride and sodium monofluorophosphate, and from about 1–50% by weight of a particulate abrasive material, wherein the particulate abrasive material comprises hydroxyapatite.

4,988,500

ORAL COMPOSITIONS

Mary A. Hunter, Cincinnati, and Joseph W. Pyrz, Hamilton, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 29, 1989, Ser. No. 414,986
Int. Cl.[5] A61K *7/20, 33/40, 31/78*
U.S. Cl. 424—53 7 Claims

1. An anhydrous oral composition comprising:
(a) a carboxyvinyl polymer;
(b) a neutralizing agent;
(c) a peroxide or perborate compound; and
(d) an anhydrous humectant; wherein the composition has an initial viscosity of from about 12 to about 100 bku's.

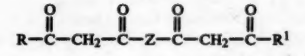
4,988,501

SUNSCREEN COMPOSITION

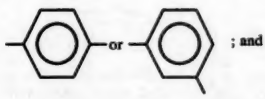
Donald J. Gosciniak, West Chester, Pa., assignor to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 284,539, Dec. 15, 1988, abandoned. This application Mar. 19, 1990, Ser. No. 495,866
Int. Cl.[5] A61K *7/40, 7/42, 7/44, 7/48*
U.S. Cl. 424—59 14 Claims

1. A sunscreen composition comprising:
(A) an effective amount of a compound having the structure:



wherein:
R and R^1 are each independently C_2–C_{10} linear or branched alkyl; and
Z is a bivalent phenylene having the structure



; and

(B) a cosmetically acceptable carrier.

4,988,502

MASCARA COMPOSITION

Hovig O. Ounanian, Princeton Junction; Kenneth A. Cohen, Aberdeen; Joseph DiSomma, Ramsey, and Harvey Gedeon, Allendale, all of N.J., assignors to Revlon, Inc., New York, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,539
Int. Cl.[5] A61K *7/02, 7/032*
U.S. Cl. 424—63 10 Claims

1. A mascara composition consisting essentially of between about 1% and about 12% of a cosmetically acceptable pigment treated with lecithin and selected from the group consisting of carmine, bismuth oxychloride, iron oxide black, iron oxide yellow, iron oxide red, zinc oxide, kaolin, ultramarine blue, ultramarine green, ultramarine pink, ultramarine red, ultramarine violet, chromium hydroxide green, chromium oxide greens, silica, manganese violet, and mixtures thereof; between about 0.5 and about 4% of a film-forming resin selected from the group consisting of polyvinyl alcohol, polyvinyl acetate, PVP, ammonium acrylates copolymer, cellulose gum, carboxymethyl hydroxyethylcellulose, acrylate/ammonium methacrylate copolymer and acrylic/acrylate copolymer; between about 0.5% and about 5% of a water dispersable thickening agent which is a complex of triethanolamine and a polymer of acrylic acid cross-linked with a polyfunctional agent, a complex of isopropylamine, sodium hydroxide or

potassium hydroxide and a polymer of acrylic acid cross linked with a polyfunctional agent magnesium aluminum silicate, cellulose gum and xanthan gum; and between about 0.1% and about 3% of a humectant selected from the group consisting of glycerin, sorbitol, propylene glycol, glycol, glycol dibehenate, glycol dioctanoate, glycol distearate, glycol hydroxystearate, glycol oleate, glycol ricinoleate, glycol salicylate, glycol stearate, glycol stearate SE, sodium PCA and mixtures thereof; and between about 60 and about 95% of water, all of said percentages being by weight based upon the total weight of the composition.

4,988,503

OIL-IN-WATER EMULSIONS FOR FOUNDATION MAKEUP COMPOSITION

Ralph A. Macchio, Monsey; Brent Slobody, New City, both of N.Y., and Julio G. Russ, Germantown, Tenn., assignors to Revlon, Inc., New York, N.Y.

Filed Jan. 24, 1990, Ser. No. 469,156
Int. Cl.[5] D61K *7/021, 7/480*
U.S. Cl. 424—63 **12 Claims**

1. A cosmetic foundation makeup composition comprising an oil-in-water emulsion which comprises, in weight %,
(a) about 0.1 to 15% of particulate talc,
(b) about 0.1 to 15% of particulate nylon,
(c) about 0.1 to 15% of a silicone oil having a viscosity of 5,000 to 10,000 cs,
(d) about 0.1 to 20% of a silicone oil having a viscosity of 5 to 500 cs,
(e) about 1 to 5% of sodium hyaluronate, and
(f) the balance, to 100%, of water.

4,988,504

SILICONE SURFACTANTS

Anthony A. Zotto, Troy; Raymond J. Thimineur, Scotia, and William J. Raleigh, Rensselaer, all of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Aug. 19, 1987, Ser. No. 87,051
Int. Cl.[5] A61K *7/32*
U.S. Cl. 424—65 **20 Claims**

1. A polysiloxane surface active agent comprising:
(a) units of the formula

$$R_2SiO_{2/2}$$

where R is hydrogen or a substituted or unsubstituted hydrocarbon radical of from 1 to 12 carbon atoms;
(b) units of the formula:

$$RR^1SiO_{22}$$

where R^1 is a polyalkylene ether of the formula:

$$-R_1{}^3-(OR^2)_n-OR^4$$

where R^2 is $-CH_2CH_2-$, R^3 is a substituted or unsubstituted alkylene group of 1 to 20 carbon atoms, R^4 is the same as R, n has a value of from 5 to about 20, and "a" is 0 or 1; and
(c) endcapping units;
with the proviso that the polysiloxane absent R^1 has a molecular weight of from about 25,000 to about 35,000 and the weight ratio of R^1 to polysiloxane absent R^1 is from greater than 15/85 to less than 35/65.

4,988,505

DEODORIZER

Yoshitane Watanabe; Keitaro Suzuki; Mutsuko Suzuki, and Eiji Okumura, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,674
Claims priority, application Japan, Sep. 16, 1988, 63-232038; Apr. 11, 1989, 1-91538
Int. Cl.[5] A61L *9/04, 9/00*
U.S. Cl. 424—76.3 **49 Claims**

1. A method of deodorizing comprising applying a colloidal antimony pentoxide as a deodorant to a site or material to be deodorized.

4,988,506

POLYSILOXANE-GRAFTED COPOLYMER NON-PRESSURE SENSITIVE TOPTICAL BINDER COMPOSITION AND METHOD OF COATING THEREWITH

Smarajit Mitra, West St. Paul, and James E. Garbe, Inver Grove Heights, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 390,228, Aug. 7, 1989. This application Apr. 11, 1990, Ser. No. 508,087
Int. Cl.[5] A61K *31/78*
U.S. Cl. 424—81 **6 Claims**

1. A hair composition comprising the following ingredients:
(a) a copolymer having a Tg of at least 20.0° C. which comprises repeating A, B, and C monomers wherein:
A is at least one free radically polymerizable methacrylic monomer present as at least 30% by weight of all monomer present;
B is at least one polar monomer copolymerizable with and different from A, the amount by weight of B monomer being from 3 to 30% of the total weight of all monomers in said copolymer; and
C is a monomer present as from 3 to 30% by weight of all monomer present and having the general formula:

$$X(Y)_nSi(R)_{3-m}Z_m$$

wherein
X is a vinyl group copolymerizable with the A and B monomers;
Y is a divalent linking group;
R is hydrogen, lower alkyl, aryl, or alkoxy;
Z is a monovalent siloxane polymeric moiety having a number average molecular weight of at least about 500 and is essentially unreactive under copolymerization conditions;
n is zero or 1;
m is an integer of from 1 to 3; and
(b) a medicinally effective amount of a medicament or a cosmetically effective amount of a conditioner or cosmetically active ingredient,
wherein (a) and (b) are present as a solution, dispersion, or emulsion in liquid carrying medium.

4,988,507

USE OF MARIGOLD ABSOLUTE, ISOBUTYRIC ACID, ISOAMYL DECANOATE AND MIXTURES OF SAME AS INSECT ATTRACTANTS

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft; Braja D. Mookherjee, Holmdel; Ira Katz, West Long Branch, and Kenneth R. Schrankel, Tinton Falls, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Filed Jan. 9, 1987, Ser. No. 2,017

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—84 9 Claims

1. A method of attracting *Musca domestica* L. (Diptera:Muscidae) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of polymer and from about 1% up to about 45% by weight of said polymer of a composition of matter selected from the group consisting of:

(i) marigold absolute;

(ii) isobutyric acid;

(iii) isoamyl decanoate;

(iv) a mixture of marigold absolute and isobutyric acid;

(v) a mixture of marigold absolute and isoamyl decanoate;

(vi) a mixture of isobutyric acid and isoamyl decanoate; and

(vii) a mixture of marigold absolute, isobutyric acid and isoamyl decanoate,

said polymer being compatible with said composition of matter.

4,988,508

USE OF BENZYL FORMATE, D-CARVONE AND D-PULEGONE AND MIXTURES OF SAME AS INSECT ATTTRACTANTS

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Filed Jan. 9, 1987, Ser. No. 2,016

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—84 8 Claims

1. A method of attracting *Musca domestica L.* (Diptera:Muscidae) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of a composition of matter selected from the group consisting of:

(i) benzyl formate;

(ii) d-carvone;

(iii) d-pulegone;

(iv) a mixture of benzyl formate and d-carvone;

(v) a mixture of benzyl formate and d-pulegone;

(vi) a mixture of d-carvone and d-pulegone; and

(vii) a mixture of benzyl formate, d-carvone and d-pulegone.

said composition of matter being compatible with said polymer.

4,988,509

USE OF DIBUTYL SUCCINATE AS INSECT ATTRACTANT

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald A. Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y. and The University of Florida, Gainesville, Fla.

Continuation-in-part of Ser. No. 879,351, Jun. 27, 1986, Pat. No. 4,801,448. This application Nov. 14, 1986, Ser. No. 930,419

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—84 1 Claim

1. A method of attracting female Mediterranean sand flies (*Phelbotomus papatasi*) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of the polymer of dibutyl succinate, said polymer being compatible with said dibutyl succinate.

4,988,510

INSECT CONTROL SYSTEM

Richard J. Brenner; Richard S. Patterson, both of Gainesville, Fla.; Roger R. Pierce, Cashiers, N.C., and Marvin H. Hult, Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 29, 1989, Ser. No. 373,310

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—84 12 Claims

1. A toxic insect bait for controlling a target insect comprising a deformable hydrophilic gel matrix comprising an amount of corn distiller's dried grain with soluble effective to attract said insect, a humectant, an insecticide which is toxic to said target insect, and a gel former in an amount effective to yield said deformable hydrophilic gel matrix subsequent to hydration.

4,988,511

INSECTICIDAL PASTE INCLUDING POWDERED BORIC ACID

Margaret K. Demetre, 9602 Highmeadow, Houston, Tex. 77063

Continuation-in-part of Ser. No. 428,984, Oct. 30, 1989, abandoned, which is a continuation-in-part of Ser. No. 103,996, Feb. 18, 1988, abandoned. This application May 29, 1990, Ser. No. 529,596

Int. Cl.[5] A01N *25/08, 25/00*

U.S. Cl. 424—84 3 Claims

1. An insecticidal paste composition in a delicately balanced formula comprised of about 56% by weight of boric acid in the powdered form of 100 to 400 mesh, 14% by weight sugar, 7% by weight milk solids, 3% by weight butter fat, 19% by weight water and 1% by weight of a liquid food coloring pigment.

4,988,512

NASAL PHARMACEUTICAL COMPOSITIONS

Moise Azria, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 870,257, Jun. 3, 1986, abandoned. This application Sep. 18, 1989, Ser. No. 408,641

Claims priority, application United Kingdom, Jun. 4, 1983, 8514090

Int. Cl.[5] A61K *9/02, 9/26, 9/44*

U.S. Cl. 424—422 12 Claims

1. A porous solid nasal insert shaped to substantially conform to the internal surface of the naris comprising a porous gelatine sponge carrying a systemically active pharmacologically active agent dispersed therein wherein the active agent is calcitonin.

4,988,513

METHOD OF TREATING HYPOKALEMIA

Edward J. Griffity, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 9, 1990, Ser. No. 462,195
Int. Cl.[5] A61K *31/66, 31/80*
U.S. Cl. 424—439 7 Claims

1. A method of treating hypokalemia in a human comprising orally administering a long-chain metaphosphate of the formula $(KPO_3)_n$ having a molecular weight of about 10,000 or greater in an amount effective to elevate the serum potassium level of the human to the range of about 3.5 mmole/l to 5.5 mmole/l.

4,988,514

PREPARATION OF LOWER ALKYL POLYSILSESQUIOXANE AND FORMATION OF INSULATING LAYER OF SILYLATED POLYMER ON ELECTRONIC CIRCUIT BOARD

Shun-ichi Fukuyama, Atsugi; Yasuhiro Yoneda, Machida; Masashi Miyagawa; Kota Nishii, both of Isehara, and Azuma Matsuura, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

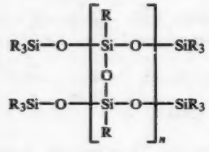
Continuation of Ser. No. 5,768, Jan. 21, 1987, abandoned, which is a division of Ser. No. 790,615, Oct. 23, 1985, Pat. No. 4,670,299. This application Dec. 2, 1988, Ser. No. 281,926
Claims priority, application Japan, Nov. 1, 1984, 59-228885; Mar. 29, 1985, 60-63359; May 17, 1985, 60-104035
The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.
Int. Cl.[5] B32B *15/02, 9/00*
U.S. Cl. 428—447 13 Claims

1. An electronic device having a multilayer wiring structure comprising:

a substrate;

a first metal wiring layer formed on portions of said substrate;

an interlayer insulation layer formed on said substrate and said first metal wiring layer and comprising a cured coating of a ladder-type silylated silsesquioxane polymer having a general formula:



where R is selected from one of a methyl, ethyl and phenyl group, and n is an integer between 50 and 10,000, thereby providing a silylated silsesquioxane polymer which is capable of melting and forming a flat plane; and

a second metal wiring layer formed on said interlayer insulation layer.

4,988,515

CARDIOPLEGIC SOLUTION

Gerald D. Buckberg, Los Angeles, Calif., assignor to The Regents of the Univ. of Calif., Berkley, Calif.

Continuation of Ser. No. 148,151, Jan. 28, 1988, abandoned, which is a continuation of Ser. No. 768,404, Aug. 21, 1985, abandoned. This application Apr. 5, 1989, Ser. No. 333,789
Int. Cl.[5] A61K *35/14, 31/70, 31/195*
U.S. Cl. 424—529 18 Claims

1. In an amino acid enriched cardioplegic solution for use in treating human hearts to prevent or reverse heart muscle damage due to ischemia, said cardioplegic solution having a calcium ion concentration, a metabolizable substrate concentration and an osmolarity, wherein the improvement comprises:

maintaining said calcium ion concentration of said cardioplegic solution at a lowered level of between about 50–300 umol;

maintaining said concentration of metabolizable substrate in said cardioplegic solution between about 400–1000 mg % wherein said metabolizable substrate is selected from the group consisting of glucose, fructose, a salt of malic acid, a salt of succinic acid and a salt of pyruvic acid; and

maintaining said osmolarity of said cardioplegic solution at an increased level of between about 400–500 mOsmol.

4,988,516

INSECTICIDE

Sherry D. Herring, Rte. One Box 307, Slocomb, Ala. 36375

Continuation of Ser. No. 841,180, Mar. 19, 1986, abandoned. This application Aug. 1, 1988, Ser. No. 226,513
Int. Cl.[5] A01N *25/00, 59/14*
U.S. Cl. 424—659 4 Claims

1. A composition for use as an insecticide, comprising boric acid and a bait that consists essentially of white wheat flour, solid white vegetable shortening, chopped onions, white cane sugar and water, wherein the ingredients of said composition are present in the relative proportion of 16 ounces of boric acid to 8 ounces of white wheat flour to 4 ounces of solid white vegetable shortening to 2 ounces of white cane sugar to 1 ounce of water and wherein said composition is in the form of flat patties.

4,988,517

METHOD AND COMPOSITION FOR INHIBITING COLON CARCINOGENESIS

Karam El-Bayoumy, New Rochelle, and Bandaru S. Reddy, Suffern, both of N.Y., assignors to American Health Foundation, Valhalla, N.Y.

Filed Sep. 27, 1988, Ser. No. 249,845
Int. Cl.[5] A61K *33/04*
U.S. Cl. 424—702 4 Claims

1. A method for inhibiting azoxymethane-induced colon tumorigenesis in a mammal comprising feeding said mammal a dietary composition comprising an organoselenium compound which is benzylselenocyanate in an amount effective to inhibit said tumorigenesis.

4,988,518

CHEWING GUM WITH LIQUID FLAVOR ADDED TO THE ROLLING COMPOUND AND METHOD

Mansukh M. Patel, Downers Grove; David Witkewitz, Ridgeview, and Vasek J. Kures, Willow Springs, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Dec. 28, 1989, Ser. No. 458,051
Int. Cl.[5] A23G *3/30*
U.S. Cl. 426—5 23 Claims

1. A chewing gum product, having a core portion comprising chewable gum base, sweetener and flavoring, and further having deposited on the surface of said core portion, a rolling compound comprising a powdered ingredient selected from the group consisting of sucrose, mannitol, starch, calcium carbonate, talc, lactitol, palatinit, lactose, and combinations thereof, said rolling compound further comprising between about 0.1 and about 2.5 weight percent of a liquid flavor, and said rolling compound being substantially free of anti-caking agents and flow agents.

4,988,519

COAGULANT FOR A NOVEL YOGHURT-LIKE FOOD

Seishi Takenawa, Nara; Mikio Ueda, Ashiya, and Hideki Takeda, Tenri, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 36,455, Apr. 9, 1987, Pat. No. 4,842,873. This application Apr. 13, 1989, Ser. No. 339,588
Claims priority, application Japan, Apr. 28, 1986, 61-100142
Int. Cl.[5] A23L *1/20, 1/05*
U.S. Cl. 426—63 6 Claims

1. A coagulant for preparation of an unfermented yoghurt-like food consisting essentially of an admixture of protease and a coagulant for tofu selected from the group consisting of glucono delta lactone, calcium sulfate, calcium chloride, calcium gluconate, calcium lactate, magnesium sulfate, magnesium chloride, calcium pantothenate and calcium glycerophosphate.

4,988,520

BINDER FOR PELLETED ANIMAL FEEDS

Jerry D. Overton, Atlantic, Iowa, assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 268,328, Nov. 7, 1988, abandoned. This application Jan. 24, 1990, Ser. No. 469,697
Int. Cl.[5] A23K *1/00*
U.S. Cl. 426—74 6 Claims

1. A process for producing pellete animal feeds with improved hardness and pellet durability consisting essentially of adding a pellet binder into a feed formulation in an amount effective to increase the hardness of the feed pellet, wherein the pellet binder comprises a water soluble form of calcium, and wherein the hardened feed pellet is free of reaction products of calcium and water soluble sugars except in impurity amounts.

4,988,521

READY-TO-EAT CEREAL OF REDUCED SODIUM CONTENT AND METHOD OF PREPARATION

Steve T. Fan, Maple Grove, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Filed Jun. 1, 1988, Ser. No. 200,997
Int. Cl.[5] A21D *13/00*
U.S. Cl. 426—93 18 Claims

1. A method for preparing an R-T-E cereal having a high level of perceived saltiness but of reduced salt content comprising the steps of:

A. providing a read-to-eat cereal base fabricated from a cereal composition having a first salt portion in a concentration ranging from about 0.5% to about 1.2% by weight of the cereal composition;

B. topically applying a saline solution consisting essentially of water and sodium chloride in amounts sufficient so as to apply a second portion of salt to the surface in a weight ratio of salt to cereal pieces such that the total salt content provided by the first and second salt portions ranges from about 1.2% to 1.8% by weight to form cereal pieces coated with the second salt portion; and

C. final drying the coated cereal pieces to a moisture content of about 1% to 5% by weight.

4,988,522

FOOD PRESERVATIVE COMPOSITIONS

Beth Z. Warren, Maryland Heights, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 118,132, Nov. 9, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 378,111
Int. Cl.[5] A23B *00/00*
U.S. Cl. 426—268 12 Claims

1. A dry particulate composition or the treatment of freshly cut plant parts said treatment consisting essentially of a single dipping in aqueous solution at ambient temperature consisting essentially of:

(a) from about 15% to about 20% of an antioxidant;

(b) from about 30% to about 35% of a metal sequestrant comprising an alkali metal acid polyphosphate salt;

(c) from about 15% to about 20% of an acidulant which provides a pH of the composition in aqueous solution below about 4.5; and

(d) from about 30% to about 35% of an inorganic chloride enzyme inhibitor,

said composition being substantially completely soluble in water at concentrations up to about 5% by weight and whereby the storage life of said plant parts is substantially extended.

4,988,523

METHOD AND COMPOSITION FOR PRESERVING FRESH PEELED FRUITS AND VEGETABLES

James Gardner; Shambhu Manohar, both of Amsterdam, and Walter S. Borisenok, Albany, all of N.Y., assignors to Liberty Enterprises, Inc., Amsterdam, N.Y.

Continuation-in-part of Ser. No. 37,990, Apr. 14, 1987. This application Mar. 21, 1990, Ser. No. 496,677
Int. Cl.[5] A23B *7/10*
U.S. Cl. 426—268 10 Claims

1. A solution for use in the process of preserving leafy vegetables and fresh-peeled fruits and vegetables comprising aqueous citric acid and an acidic polyphosphate compound dissolved therein.

4,988,524

METHOD FOR PROCESSING RAW MEAT BY USE OF AN OIL AND FAT EMULSION

Koichi Obata, and Yoshihiko Noriuchi, both of Chofu, Japan, assignors to Wakodo Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 424,895
Claims priority, application Japan, Nov. 2, 1988, 63-278268
Int. Cl.[5] A23L *1/318*
U.S. Cl. 426—281 10 Claims

1. A method for processing raw meat, which comprises injecting an emulsified aqueous mixture comprising an oil or fat which is solid at normal temperature and emulsified with a casein alkali salt decomposed with a milk coagulating enzyme; and calcium ion, into raw meat tissue, followed by coagulation and fixing of the emulsion.

4,988,525

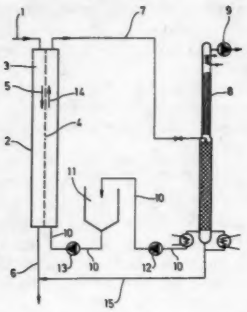
PROCESS FOR SELECTIVE REMOVAL OF VOLATILE SUBSTANCES FROM LIQUIDS, AS WELL AS UNIT AND DEVICE FOR CARRYING OUT THE PROCESS

Walter Gresch, Niederweningen, Switzerland, assignor to Bucher-Guyer AG Maschinenfabrik, Niederweningen, Switzerland

PCT No. PCT/CH88/00145, § 371 Date Apr. 26, 1989, § 102(e) Date Apr. 26, 1989, PCT Pub. No. WO89/01965, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 24, 1988, Ser. No. 358,345
Claims priority, application Switzerland, Aug. 28, 1987, 3328/87
Int. Cl.[5] A23L *2/30;* C12L *1/00*
U.S. Cl. 426—493 26 Claims

1. Process for selective removal of volatile substances from liquids including alcohol from wine, beer and fermented fruit juices by diaphragm separation processes and at least one additional separation process, the steps comprising subjecting the liquid to a diaphragm separation process in which a transdiaphragm pressure is increased beyond that of a dialysis process such that a permeate consisting mainly of water and volatile substances is separated from the liquid by the increased transdiaphragm pressure and the difference in concentrations, subjecting the permeate to a liquid-volatile separation process

to remove a volatile substance therefrom, and feeding back at least partially a residue resulting from the liquid-volatile separation process into the permeate side of the diaphragm separation process.



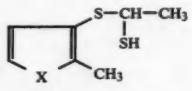
4,988,526

HEMIMERCAPTALS, PROCESSES FOR THEIR PREPARATION, AND EDIBLE COMPOSITIONS CONTAINING SAME

Jürgen Brüning; Roland Emberger; Matthias Güntert; Rudolf Hopp; Manfred Köpsel; Theodor Sand, all of Holzminden, and Peter Werkhoff, Hoexter, all of Fed. Rep. of Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,481
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1988, 3831981
Int. Cl.[5] A23L *2/26*
U.S. Cl. 426—535 6 Claims

1. A heminercaptal of the formula



(I)

in which

X is oxygen or sulphur.

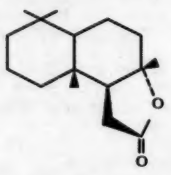
4,988,527

USE OF SCLAREOLIDE IN AUGMENTING OR ENHANCING THE ORGANOLEPTIC PROPERTIES OF FOODSTUFFS

Lawrence L. Buckholz, Jr., Middletown; Mohamad I. Farbood, Holmdel, both of N.J.; Nicolas Kossiakoff, Chambourcy, France; Lewis G. Scharpf, Fair Haven, and Eugene W. Seitz, Middletown, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 534,880, Jun. 8, 1990, Pat. No. 4,960,603, which is a continuation-in-part of Ser. No. 474,410, Jan. 2, 1990, Continuation of Ser. No. 418,171, Sep. 29, 1989, Pat. No. 4,917,913. This application Aug. 7, 1990, Ser. No. 563,608
Int. Cl.[5] A23L *1/226*
U.S. Cl. 426—536 1 Claim

1. A process for enhancing the saltiness of a product containing sodium chloride and/or potassium chloride comprising the step of adding to said product from about 0.5 ppm up about to 100 ppm of sclareolide having the structure:

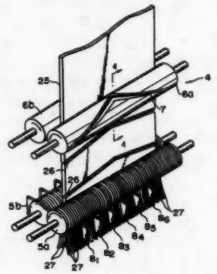


4,988,528

INSTANT NOODLES AND METHOD FOR MANUFACTURING INSTANT NOODLES

Yoshio Tomoda, Tokyo, Japan, assignor to Toyo Suisan Kaisha, Ltd., Tokyo, Japan

Filed Jul. 31, 1989, Ser. No. 387,857
Claims priority, application Japan, Dec. 27, 1988, 63-329766
Int. Cl.[5] A23L *1/16, 1/162*
U.S. Cl. 426—557 15 Claims



6. A method for manufacturing instant noodles, comprising the steps of:

forming dough into a strip;

moving said strip longitudinally in a direction of travel;

forming a plurality of indented portions throughout a widthwise direction of said strip at intervals along a longitudinal or length direction of said strip;

linearly cutting said strip having said plurality of indented portions, said strip being cut lengthwise in the direction of travel thereof, into raw noodles;

dividing said cut raw noodles into a plurality of rows in said direction of travel and waving said cut and divided raw noodles so that said raw noodles vertically overlap each other;

steaming the waved raw noodles; and

cutting the steamed raw noodle groups to a desired length such that each noodle of the noodle groups has a plurality of indented portions therein, and whereby said noodles are separable at said indented portions into respective shorter noodles upon subsequent cooking thereof.

4,988,529

MILK SHAKE AND MANUFACTURING METHOD THEREOF

Tsunemoto Nakaya; Taizo Karasawa; Nobuyuki Kihara; Yukihiro Wada, all of Osaka, and Masao Kiyota, Hyogo, all of Japan, assignors to Nissei Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1989, Ser. No. 328,528
Int. Cl.[5] A23G *9/02;* A23L *2/38*
U.S. Cl. 426—569 17 Claims

1. A milk shake product comprising soft ice cream which comprises 15.30–40 weight % of carbohydrates containing 15–35 weight % of sugar and 0.3–1.3 weight % of alcohol, 1–7 weight % of protein and 1–25 weight % of oil/fat, and the

overrun percentage being set at 10 to 100, said soft ice cream being in such a beaten state as can be drunk with a straw.

4,988,530

SOLUBLE DIETARY FIBER FORTIFIED BEVERAGE

Kenneth P. Hoersten, Fremont; Albert D. Bolles, Spring Lake; Duane G. Dougan, Hesperia, and Marcia E. Akad, Fremont, all of Mich., assignors to Gerber Products Company, Fremont, Mich.

Filed Mar. 21, 1990, Ser. No. 496,808
Int. Cl.[5] A23L *2/02*
U.S. Cl. 426—577 28 Claims

1. A beverage comprising a liquid carrier, and a soluble dietary fiber supplement consisting essentially of gum arabic and a pectin having a degree of esterification of at least 50%, wherein the amount of gum arabic is in the range from 1 to 4 weight percent and the amount of pectin is in the range from 0.2 to 1.2 weight percent, said weight percents being based on total weight of beverage, and wherein the amount of fiber supplement is sufficient to provide a fiber level of at least 2 grams per 8 fluid ounce beverage.

4,988,531

METHOD FOR MANUFACTURING GEL PIECES

Carl O. Moore, Rochester, and James R. Dial, Moweaqua, both of Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Nov. 7, 1989, Ser. No. 432,448
Int. Cl.[5] A23L *1/05*
U.S. Cl. 426—578 10 Claims

1. A method of preparing a gel confection comprising:

obtaining a high solids, cooked mixture comprising an amount of a thin-boiling common starch effective to form a gel and a sweetener system comprising a high fructose corn syrup and a crystalline sweetener comprised of fructose, wherein said fructose in said crystalline sweetener comprised of fructose does not exist in crystalline form in said high solids, cooked mixture,

depositing said cooked mixture into a plurality of molds wherein said cooked mixture is allowed to set to form a plurality of gel pieces, and

packaging said plurality of gel pieces together in bulk, wherein the cumulative concentration of high fructose corn syrup and crystalline sweetener is sufficiently high to provide resistance of said gel pieces to adhesion in said bulk packaging.

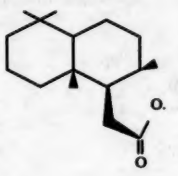
4,988,532

USE OF SCLAREOLIDE TO DEBITTER A COFFEE BEVERAGE

Lawrence Buckholz, Jr., Middletown; Mohamad I. Farbood, Holmdel, both of N.J.; Nicolas Kossiakoff, Chambourcy, France, and Lewis G. Scharpf, Fair Haven, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 535,525, Jun. 8, 1990, Pat. No. 4,966,783, which is a division of Ser. No. 474,410, Jan. 2, 1990, which is a continuation of Ser. No. 418,171, Sep. 29, 1989, Pat. No. 4,917,913. This application Aug. 7, 1990, Ser. No. 563,609
Int. Cl.[5] A23F *5/14*
U.S. Cl. 426—594 1 Claim

1. A process for debittering a coffee beverage which has a bitter taste nuance comprising the step of adding to said coffee a debittering quantity of sclareolide having the structure:

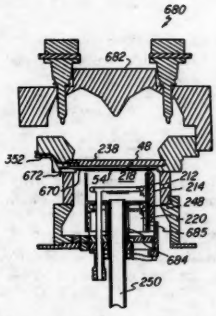


4,988,533

METHOD FOR DEPOSITION OF SILICON OXIDE ON A WAFER

Dean W. Freeman, Plano; Joseph D. Luttmer, Richardson; Patricia B. Smith, Euless, and Cecil J. Davis, Greenville, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 27, 1988, Ser. No. 203,583
Int. Cl.[5] B05D *3/06, 3/00*
U.S. Cl. 427—38 10 Claims



1. A method for deposition of silicon oxide on a wafer comprising:

(a) disposing said wafer in a process chamber within a process module at low pressure;

(b) generating a remote plasma from nitrous oxide gas;

(c) introducing said remote plasma into said chamber and to a face of the wafer;

(d) introducing a silane gas mixture into said chamber and to the face of the wafer;

(e) illuminating said silane and the remote plasma within said chamber with additional ultraviolet light produced within said module; and

(f) maintain the temperature within said chamber with the range of about 100 degrees to less than 100 degrees C.

4,988,534

TITANIUM CARBIDE COATING OF BEARING COMPONENTS

Kamleshwar Upadhya, Glendale, Wis., assignor to General Electric Company, Milwaukee, Wis.

Division of Ser. No. 331,508, Mar. 31, 1989. This application Jan. 22, 1990, Ser. No. 467,910
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—38 3 Claims

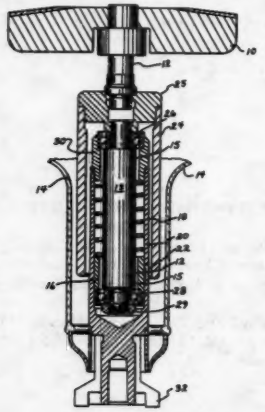
1. A method of producing a lubricated bearing retainer assembly for use in an x-ray tube comprised of a bearing sleeve supporting an outer retainer substrate and a bearing fitted within the bearing sleeve, comprising the steps of:

removing contaminants from the bearing substrate surfaces;

heating the bearing retainer to substantially 450° C.;

depositing a ceramic layer on the outer surfaces of the re-

tainer substrate by plasma assisted physical vapor deposition under a biasing field in a low pressure environment



where the biasing voltage is substantially 100 volts and the pressure is maintained between 10^{-4} and 10^{-2} torr.

4,988,535

MAGNETIC RECORDING MEDIUM

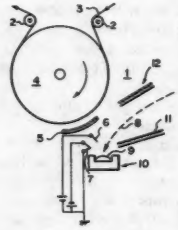
Yoshihiro Arai; Tadashi Yasunaga, and Ryuji Shirahata, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minamiashigara, Japan

Division of Ser. No. 113,380, Oct. 27, 1987, Pat. No. 4,055,068. This application Sep. 12, 1988, Ser. No. 242,869

Claims priority, application Japan, Aug. 24, 1984, 59-176164

Int. Cl.[5] C23C *16/00*

U.S. Cl. 427—38 **2 Claims**



1. A method of forming a non-binder type magnetic recording medium comprising the steps of

providing a non-magnetic substrate; and

depositing on the non-magnetic substrate a magnetic film layer by oblique incidence deposition where the magnetic film layer is, during its formation, exposed to oxygen gas and ionized nitrogen;

whereby a major component of the magnetic film layer is iron nitride-oxide which extends from the upper surface of the magnetic film layer to the non-magnetic substrate, and said magnetic film layer is formed of a material having a composition represented by formula

$$Fe_{1-y}N_xO_y$$

wherein $0.25<x+y<0.60$.

4,988,536

METHOD FOR ACTIVATING A METAL SURFACE

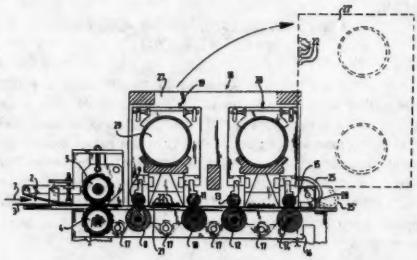
Cornelis J. Van Dongen, Diepenveen, and Gerrit H. F. Ter Horst, Schalkhaar, both of Netherlands, assignors to Thomassen & Drijver-Verblifa N.V., Netherlands

Filed Dec. 1, 1989, Ser. No. 444,543

Claims priority, application Netherlands, Dec. 2, 1988, 8802982

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—39 **26 Claims**



1. A method for activating a metal surface of an article, comprising the steps of:

(1) providing a metal surface having a lubricant lightly applied thereto; and

(2) subjecting the metal surface to a corona discharge by applying an alternating voltage, between the metal surface and a conductor situated thereabove.

4,988,537

COATING METHOD

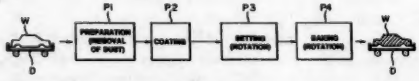
Yoshio Tanimoto; Tadamitsu Nakahama; Takakazu Yamane, and Shunji Masuda, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Mar. 24, 1989, Ser. No. 328,544

Claims priority, application Japan, Mar. 25, 1988, 63-71337; Mar. 25, 1988, 63-71339

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—46 **28 Claims**



1. A coating method comprising:

a coating step for spraying a surface of a substrate with a paint; and

a drying step for drying the paint sprayed on the surface of the substrate;

wherein the paint is sprayed during the coating step to form a coat in a film thickness which is thinner than a thickness at which the coat begins to sag in either the coating step or the drying step;

wherein an action is applied from outside the substrate in at least one of the coating and drying steps so as to cause the paint coated on the substrate to flow or sag in the drying step; and

wherein the substrate is rotated about an axis extending substantially horizontally in a longitudinal direction of the substrate while the paint of the coat flows as a result of the application of the action from the outside at a speed which is high enough to rotate the substrate before the paint of the coat substantially sags due to gravity yet which is low enough so as to cause no sagging as a result of centrifugal force.

2. A coating method as claimed in claim 1, wherein the

drying step comprises a setting step and a baking step and an ambient temperature in the setting step is lower than the temperature during the baking step.

3. A coating method as claimed in claim 2, wherein the action is applied by heating the paint coated thereon in the setting step.

7. A coating method as claimed in claim 3, wherein the heating is effected by a high-frequency induction coil.

4,988,538

CERAMIC COATING

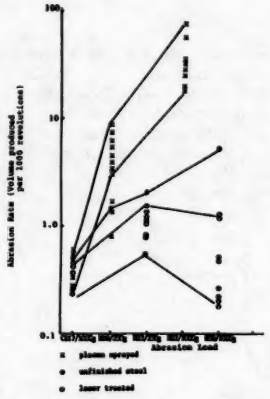
Knut Horvei, and Jonas S. Sandved, both of Sandnes, Norway, assignors to Den norske stats oljeselskap a.s., Norway

Continuation of Ser. No. 43,694, Apr. 29, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,084

Claims priority, application Norway, Apr. 30, 1986, 861700

Int. Cl.[5] B05D *3/06, 1/08*

U.S. Cl. 427—53.1 5 Claims



1. A method for producing a corrosion and wear resistant substantially poreless and crackless ceramic chromium oxide coating on a substrate comprising the steps of:

applying a ceramic chromium oxide coating material to said substrate to form a coat of ceramic chromium oxide on said substrate; impregnating said ceramic chromium oxide material with chromium oxide precursor prior to glazing and forming a substantially poreless and crackless chromium oxide coating by glazing said coat of ceramic chromium oxide by means of laser irradiation to at least partially melt said coating and cause chemical bonding in said coating and leaving the substrate essentially unaffected by the melting of the coating material, thereby making said ceramic coating corrosion and wear resistant and substantially poreless and crackless.

4,988,539

METHOD OF MANUFACTURING A GAS DETECTION SENSOR, AND THE RESULTING SENSOR

Philippe Breuil, Saint-Etienne; Christophe Pijolat, La Talaudiere; Guy Tournier, and Lalauze René , both of Saint-Etienne, all of France, assignors to Association pour la Recherche et le Developpment des Methodes et Processus Industriels - Armines, Paris, France

Filed Dec. 6, 1989, Ser. No. 446,545

Claims priority, application France, Dec. 6, 1988, 88 15975

Int. Cl.[5] B05D *5/12*

U.S. Cl. 427—126.3 5 Claims

1. A method of manufacturing a sensor for detecting trace or impurity gases, the method comprising evaporating tin and/or tin oxides under a partial pressure of oxygen in order to condense vapor thereof on an electrically insulating substrate to obtain a porous layer deposit thereon, wherein the evaporation of the metal or the metal oxides is performed under a flow of a mixture of gases containing both oxygen and an inert gas at a total pressure lying in the range 100 Pa to 200 Pa and with the partial pressure of the oxygen in the mixture lying in the range 20 Pa to 130 Pa.

4,988,540

METHOD OF MAKING FLUOROPOLYMER LAMINATES

Chester G. Bragaw, Jr., Kennett Square; Thomas P. Concannon, Newtown Square, both of Pa., and Robert F. Davis, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 198,521, May 25, 1988, Pat. No. 4,877,683. This application Jul. 11, 1989, Ser. No. 378,095

Int. Cl.[5] B05D *7/04, 1/00;* B29C *41/32*

U.S. Cl. 427—155 7 Claims

1. A process for the preparation of a fluropolymer laminate having at least one layer of polyvinyl fluoride which comprises forming a first fluoropolymer layer, applying a second fluoropolymer layer as a dispersion, and coalescing the second fluoropolymer layer at a temperature below the melting point of the first fluoropolymer layer wherein the resulting laminate has a film-tearing interfacial bond and substantially no interfacial comingling of the adjacent fluoropolymer layers beyond the molecular level.

4,988,541

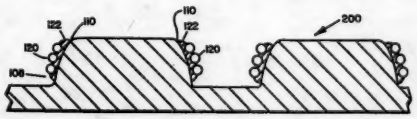
PROCESS FOR MAKING RETROREFLECTOR SHEET

Thomas P. Hedblom, Eagan, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Division of Ser. No. 204,349, Jun. 9, 1988, abandoned. This application Jan. 2, 1990, Ser. No. 459,532

Int. Cl.[5] B05D *5/06*

U.S. Cl. 427—163 6 Claims



1. A process for producing a retroreflective sheet comprising the steps of:

(A) providing a resilient polymeric continuous web base sheet having a back surface and a plurality of protrusions projecting from a front surface of the sheet opposite said back surface, each of the protrusions having a top surface and at least one side surface;

(B) applying a discontinuous layer of a liquid bead bond material to selected portions of the side surfaces of the protrusions by conveying the web over a roller where the protrusions are pressed against a film of bead bond material, the pressure over the area of web in contact with the bead bond film being sufficient to keep the bead bond material off the top surfaces of the protrusions and force the bead bond material onto selected portions of the side surfaces;

(C) partially embedding a plurality of retroreflecting beads in the liquid layer of bead bond material; and

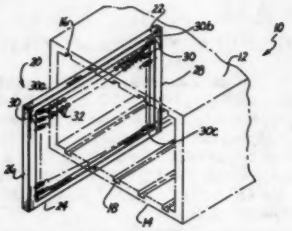
(D) solidifying the bead bond layer to form a retroreflector sheet.

4,988,542

METHOD FOR FABRICATING DECORATIVE BEAD CHAINS

John Kiapos, and Dennis Lotz, both of 9161 La Tuna Canyon Rd., Sun Valley, Calif. 91352

Division of Ser. No. 425,129, Oct. 23, 1989. This application Feb. 8, 1990, Ser. No. 476,937
Int. Cl.[5] B05D 3/02, 3/12, 5/00
U.S. Cl. 427—172 7 Claims



1. The method of producing a decorative shot or bead chain, each element of which is permanently coated with a variegation of colors, said method comprising:

(a) preheating the chain to at least 250 degrees Fahrenheit for a brief period to bring the chain to such temperature;

(b) suspending the chain and, while so suspended, applying to each of at least two different areas of each shot or bead a different color paint; and

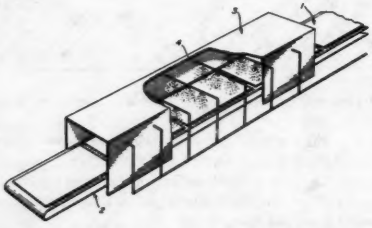
(c) subjecting the thus painted chain to further heating for a sufficient period to anneal the paint to the outside surfaces of the shot or beads of the chain.

4,988,543

PROCESS FOR INCORPORATION OF A PHASE CHANGE MATERIAL INTO GYPSUM WALLBOARDS AND OTHER AGGREGATE CONSTRUCTION PANELS

Jean-Francois Houle, St. Hyacinthe, and Jean Paris, Montreal, both of Canada, assignors to Ecole Polytechnique, Montreal, Canada

Filed Sep. 25, 1989, Ser. No. 411,642
Int. Cl.[5] B05D 1/02, 3/02
U.S. Cl. 427—372.2 7 Claims



1. A method of impregnating one side of a porous board with a precise amount of compatible phase change material, said method comprising applying a predetermined amount of said phase change material at a predetermined rate to said surface so that a predetermined amount of phase change material is impregnated, said rate being lower than the absorption rate of said phase change material, at least said one side of said board being at a temperature above the melting point of said phase change material during said impregnation.

7. A method as claimed in claim 1 wherein said method comprises applying a solid phase change material to said one side of said board and thereafter subjecting said board to heat to melt said material into said one side.

4,988,544

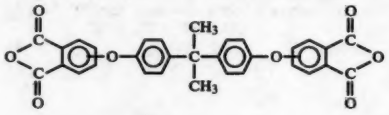
BISPHENOL-A DIANHYDRIDE-BASED POLYIMIDE MATRIX RESINS AND METHOD OF PREPARATION

James A. Cella, Clifton Park, and Marsha M. Grade, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,842
Int. Cl.[5] C08K 5/05
U.S. Cl. 427—384 5 Claims

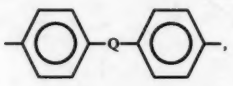
1. A method for preparing a polyimide composite which comprises the steps of impregnating a fiber composition with a solution in at least one aliphatic alcohol of a monomer mixture comprising

(a) an aromatic ether dianhydride of the formula

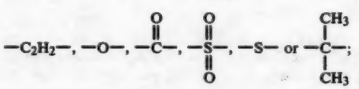


or a corresponding alkyl diester or di-halfester;

(b) an aromatic diamine of the formula $H_2N\text{-}R\text{-}NH_2$, wherein R is a divalent aryl radical selected from the class consisting of aromatic hydrocarbon radicals having 6–20 carbon atoms and halogenated derivatives thereof, alkylene radicals and cycloalkylene radicals having 2–20 carbon atoms, C_{2-8} alkylene-terminated polydiorgansiloxane and divalent radicals of the formula

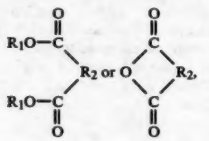


wherein Q is a covalent bond,

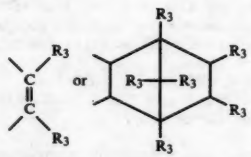


and

(c) a monoalkyl or dialkyl ester of a dicarboxylic acid, or a corresponding dianhydride, having the formula



wherein R_1 is alkyl or hydrogen and at least one R_1 is alkyl, and R6hd 2 is a divalent radical of the formula



wherein R_3 is hydrogen or C_{1-4} lower alkyl; effecting in situ polymerization of said monomers at a temperature in

the range of 60–300° C.; the molar ratio of reagents A, B and C being n:(n+1):2, wherein n is from 1 to 20.

4,988,545

METHOD FOR TREATING WOOD AGAINST FUNGAL ATTACK

Peter E. Laks, Hancock, Mich., assignor to Board of Control of Michigan Technological University, Houghton, Mich.

Filed Aug. 17, 1989, Ser. No. 394,802
Int. Cl.[5] B05D *1/18*
U.S. Cl. 427—440 **7 Claims**

1. A method for treating wood against fungal attack comprising:

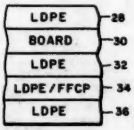
impregnating the wood with an effective amount of a liquid preservative including a sulfited tannin extract complexed with a copper (II) ion.

4,988,546

FLAVOR/FRAGRANCE ENHANCED COMPOSITE STRUCTURES

Cynthia L. Tanner, and Allan A. Whillock, both of Mobile, Ala., assignors to International Paper Company, Purchase, N.Y.

Filed Jun. 17, 1988, Ser. No. 207,859
Int. Cl.[5] B27N *5/00*
U.S. Cl. 428—34.2 **24 Claims**



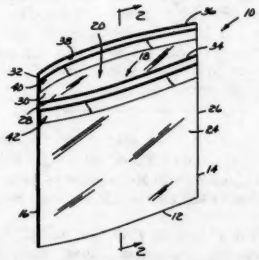
1. A multi-layer laminate structure including a carrier layer of material imparting stiffness to the laminate, a layer of low density polyethylene provided on both sides of the carrier layer, the improvement comprising: a buried layer of a blend of a low density polyethylene polymer and a polymer flavor/fragrance concentrate and a product-contact layer of a low density polyethylene polymer which can be heat-sealed with the outer layer of low density polyethylene on conventional equipment at temperatures ranging from 250° F.–500° F. to enhance product aroma.

4,988,547

SECURITY DEPOSIT BAG

Leonard M. Voto, Jr., Forest Lake, and Shari J. Wilson, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 19, 1989, Ser. No. 354,622
Int. Cl.[5] B65D *33/18*
U.S. Cl. 428—35.2 **12 Claims**



1. A bag comprising a front panel formed of a polymeric heat-sealable material and a rear panel formed of a polymeric heat-sealable material, said front panel and rear panel having respective side and bottom portions sealed together leaving an unsealed end of said front panel, said rear panel extending beyond the unsealed end of said front panel to form a flap foldable over said unsealed end of said front panel, said flap having disposed thereon a first area of adhesive means, said front panel having disposed thereon a second area of adhesive means coextensive with said first area of adhesive means when said flap is folded so as to close said bag, said first area of adhesive means bonded by means by heating, fusing, or the like, to said flap by means of a first backing made of polymeric heat-sealable material compatible with the material of said flap, said second area of adhesive means bonded by means of heating, fusing, or the like to said front panel by means of a second backing made of polymeric heat-sealable material compatible with the material of said front panel, said first area of adhesive means and said second area of adhesive means capable of forming a bond having a bond strength greater than.

(a) the strength of the second backing-to-front panel bond,

(b) the strength of the first backing-to-flap bond,

(c) the tear strength of the first backing, and

(d) the tear strength of the second backing.

4,988,548

NOVEL VULCANIZABLE RUBBER COMPOSITIONS AND APPLICATIONS THEREOF

Yasuhiko Takemura; Shinichiro Zen; Yoshiaki Zama, all of Yokkaichi, and Hiroji Enyo, Suzuka, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Division of Ser. No. 169,129, Mar. 10, 1988, Pat. No. 4,822,654. This application Nov. 22, 1988, Ser. No. 274,963
Claims priority, application Japan, Jan. 31, 1985, 60-15561; Mar. 30, 1985, 60-67683
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] C08L *37/16, 27/00, 27/12;* F16L *11/04*
U.S. Cl. 428—368 **10 Claims**

1. A vulcanizable rubber composition comprising (1) 100 parts by weight of a polymer composition comprising:

(I) a vinylidene fluoride resin containing at least 90 mole % vinylidene fluoride,

(II) at least one rubber selected from the group consisting of acrylic rubbers, α,β-unsaturated nitrile-conjugate diene copolymer rubbers and hydrides of α,β-unsaturated nitrile-conjugated diene copolymer rubbers, said acrylic rubber consisting of (A) 30 to 99.9% by weight of an alkyl acrylate and/or an alkoxy-substituted alkyl acrylate, (B) 0.1 to 10% by weight of a cross-linkable monomer and (C) 0 to 70% by weight of another ethylenically unsaturated compound copolymerizable with (A) and (B) (the sum of (A), (B) and (C) is 100% weight), and said α,β-unsaturated nitrile-conjugated diene copolymer rubber consisting of (D) 10 to 60% by weight of an α,β-unsaturated nitrile, (E) 15 to 90% by weight of a conjugated diene and (F) 0 to 75% by weight of another ethylenically unsaturated compound copolymerizable with (D) and (E) (the sum of (D), (E) and (F) is 100% by weight), and

(III) an optional blendable polymer,

wherein the weight ratio of (I)/[(II)+(III)] is 5/95 to 60/40 and the weight ratio of (II)/(III) is 100/0 to 50/50, and (2) 0 to 40 parts by weight of a plasticizer.

10. A rubber hose made from a vulcanizable rubber composition according to claim 1.

4,988,549

MULTILAYERED MOULDED PRODUCTS BASED ON POLYAMIDES

Rolf-Volker Meyer; Friedrich Fahnler, both of Krefeld; Hanns-Peter Müller, Bergisch-Gladbach; Martin Wandel, Dormagen, and Hans-Detlef Heinz, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 14, 1989, Ser. No. 393,132

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3828689

Int. Cl.[5] B65D *25/14;* B32B *27/08;* B05D *7/22*

U.S. Cl. 428—35.7 15 Claims

1. A process for preparing a multi-layered moulded article having barrier properties, said moulded article comprising a polyamide and having a duromer layer cured thereon, the process comprising providing a heat-curable reaction resin mixture containing:

(a) at least one organic polyisocyanate;

(b) at least one organic compound containing at least 2 epoxide groups,

components (a) and (b) being contained in a quantity corresponding to an appropriate ratio of isocyanate groups to epoxide groups of from 1.2:1 to 70:1.

(c) at least one alkylating agent which inhibits the reaction of (a) and (b); and

(d) from 0.1 to 10%, based on the weight of components (a)+(b)+(c), of at least one heat-activatable catalyst, and applying the heat-curable reaction resin mixture to a moulded polyamide article and thereafter thermally curing the reaction resin mixture to form said duromer layer on the moulded polyamide article.

4,988,550

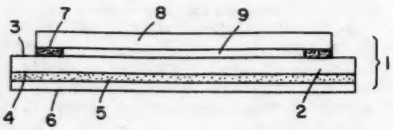
CONDUCTIVE MASKING LAMINATE

Paul Keyser, Newbury, Mass.; Peter Jones, Londonderry, N.H., and John D. Hubbard, Billerica, Mass., assignors to Chomerics, Inc., Woburn, Mass.

Filed Jul. 28, 1989, Ser. No. 386,393

Int. Cl.[5] B32B *7/06, 7/12*

U.S. Cl. 428—40 35 Claims



1. A masking laminate comprising an adhesive layer, a metal foil layer adhered to an upper surface of the adhesive layer, a plurality of adhesive strips formed along a length of the metal foil layer on a side opposite to the adhesive layer, the adhesive strips running parallel to an outer edge of the metal foil, the adhesive strips being spaced apart from one another so as to form one or more adhesive free areas on a surface of the foil layer, at least one of the adhesive free areas being centrally located on the foil layer and at least one releasable mask layer adhered to an upper surface of the adhesive strips.

4,988,551

CARPET HAVING NONWOVEN FLEECE ADHERED TO SECONDARY BACKING BY EMBOSSING AND METHOD OF MAKING SAME

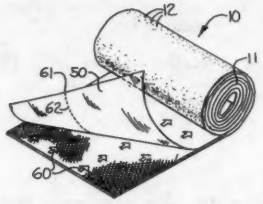
Stephen A. Zegler, Cohutta, Ga., assignor to Collins & Aikman Floor Coverings Corporation, Dalton, Ga.

Filed Oct. 2, 1989, Ser. No. 416,013

Int. Cl.[5] B32B *7/06, 31/20*

U.S. Cl. 428—40 19 Claims

1. A floor covering comprising a carpet having textile fibers defining a fibrous upper outer face and a primary backing to which the textile fibers are secured, a secondary backing permanently adhered to the lower surface of said primary backing, a nonwoven fleece fabric positioned against said secondary backing and being embossed so as to form high and low areas with the low areas extending into said secondary backing and serving to unitize the fleece fabric with the secondary backing, a layer of pressure sensitive adhesive on the exposed outer face of said fleece fabric for releasably securing the floor



covering to an underlying floor, and a release cover releasably secured to said layer of pressure sensitive adhesive to protect and maintain the tackiness of the adhesive layer before laying of the floor covering on an underlying floor, and with the low areas in the embossed fleece fabric serving for reducing the effective exposed surface area of the layer of adhesive that is available to contact the underlying floor when laying of the floor covering thereon.

4,988,552

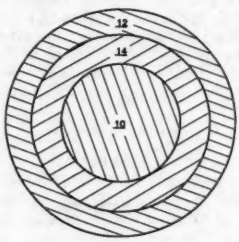
ELECTRICAL DISCHARGE MACHINING ELECTRODE

Dandridge S. Tomalin, Chagrin Falls, Ohio, assignor to Composite Concepts Company, Twinsburg, Ohio

Filed Jun. 17, 1988, Ser. No. 208,146

Int. Cl.[5] B23H *1/06;* B23K *35/22*

U.S. Cl. 428—677 9 Claims



1. A wire electrode for an EDM process, comprising:

(a) a copper clad steel core having a conductivity of at least 50% IACS;

(b) a homogenous copper/zinc alloy outer layer bonded to said core wire by a mechanical cladding process using pressure and heat whereby a metallurgical bond is effected between said core wire and said outer layer, said outer layer comprising substantially 35%–50% (by volume) of the overall electrode.

4,988,553

MOUNTING STRUCTURE OF SWITCHING UNIT

Shinichi Saiki, and Kiyoshi Koide, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Mar. 23, 1989, Ser. No. 327,783

Claims priority, application Japan, Mar. 31, 1988, 63-43622[U]

Int. Cl.[5] B32B *3/06*

U.S. Cl. 428—99 7 Claims

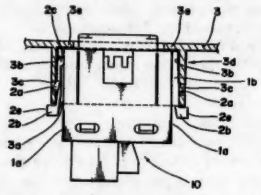
1. A mounting structure of a switching unit which is detach-

ably held into a holding aperture of a switching unit-mounting member, comprising:

an engaging opening formed at an inner surface of the holding aperture; and

an elastic holding-pawl, a front end of which is fixed to a side of a case of the unit, said holding-pawl having an engaging portion at a middle portion thereof and a press portion at a back end thereof;

the engaging portion confronting the inner surface of the holding aperture to detachably engage with said engaging opening upon inserting the unit into the holding aperture, the press portion being protruded to an outside of the holding aperture in a backward direction with respect to the unit, said pawl having enough inherent elasticity to enable the engaging portion to be disengaged rom said



engaging opening by pressing the press portion in a direction away from the inner surface of the holding aperture;

wherein said pawl has a pair of holding-pawl bodies and a T-shaped member of which both sides of a front portion are integrally connected with the bodies; wherein each body has a front end fixed to the side of the case, and a back end; the back end of one of the bodies has the engaging portion and the back end of the other of the bodies has another engaging portion capable of engaging into another engaging opening formed at the inner surface of the holding aperture in a backward direction with respect to the unit; and the press portion is formed at a back end of the T-shaped member; whereby, both of the engaging portions are capable of being removed from the engaging openings by pressing the press portion.

4,988,554

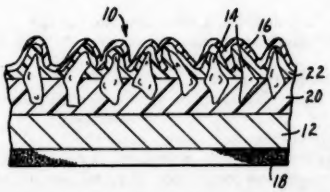
ABRASIVE ARTICLE COATED WITH A LITHIUM SALT OF A FATTY ACID

Scott W. Peterson, Eagan, and Marvin J. Schroeder, Woodbury, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 23, 1989, Ser. No. 370,812

Int. Cl.[5] B32B *5/16;* **C09J** *7/02;* **C09K** *3/14*

U.S. Cl. 428—142 **15 Claims**



1. A package of coated abrasive articles comprising at least two coated abrasive articles wherein each coated abrasive product comprises:

a. a backing,

b. a layer of abrasive grains secured to one major surface of said backing by at least one binder,

c. a loading resistant coating applied over said layer of abrasive grains, wherein said loading resistant coating comprises a lithium salt of a fatty acid, and

d. a layer of pressure-sensitive adhesive applied to the major surface of the backing opposite the major surface bearing the abrasive grains,

wherein the loading resistant coating of one of the coated abrasive articles is in direct, releasable contact with the pressure-sensitive adhesive layer of another of the coated abrasive articles.

4,988,555

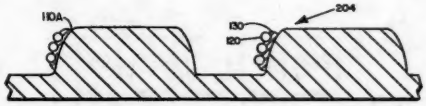
PATTERNED PAVEMENT MARKING

Thomas P. Hedblom, Eagan, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 204,349, Jun. 9, 1988, abandoned. This application Jan. 2, 1990, Ser. No. 459,940

Int. Cl.[5] B32B *18/00;* **E01F** *9/00*

U.S. Cl. 428—172 **10 Claims**



1. A retroreflective sheet comprising:

a resilient polymeric base sheet having a front surface;

a plurality of integral protrusions projecting from the front surface, there being a plurality of such protrusions across the width and down the length of the sheet, each of the protrusions having a top surface and at least one side surface connecting the top surface to the front surface of the base sheet;

a first discontinuous layer of bead bond covering a selected set of side surfaces of each of the protrusions; and

a first plurality of retroreflecting beads partially embedded in the layer of bead bond and partially protruding from the layer of bead bond,

said retroreflective sheet being characterized in that said selected set of side surfaces is covered by a combination of bead bond and retroreflecting beads absent from the remaining front surface between the protrusions.

6. A retroreflective sheet comprising:

a resilient polymeric base sheet having a front surface;

a plurality of integral protrusions projecting from the front surface, there being a plurality of such protrusions across the width of the sheet, each of the protrusions having a top surface and at least one side surface connecting the top surface to the front surface of the base sheet;

a first discontinuous layer of bead bond covering a selected set of side surfaces of the protrusions;

a first plurality of retroreflecting beads partially embedded in the layer of bead bond and partially protruding from the layer of bead bond;

a second layer of bead bond covering a second selected set of side surfaces of the protrusions; and

a second plurality of particles partially embedded in the second layer of bead bond, the combination of said second bead bond and said second plurality of particles being substantially different from the combination of said first layer of bead bond and said first plurality of retroreflective beads.

10. A retroreflective sheet which comprises:

a resilient polymeric base sheet having a front surface;

a plurality of integral protrusions projecting from the front surface, there being a plurality of such protrusions across the width of the sheet, each of the protrusions having a top surface and at least one side surface connecting the top surface to the front surface of the base sheet;

a first discontinuous layer of bead bond covering a selected set of side surfaces of the protrusions;

a first plurality of retroreflecting beads partially embedded in the first layer of bead bond and partially protruding from the first layer of bead bond;

a second layer of bead bond covering the top surfaces of the protrusions; and

a plurality of skid prevention particles partially embedded in the second layer of bead bond.

4,988,556

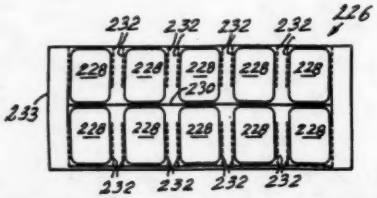
POCKET MOUNT

Carl G. Nilsen, Brookfield; Gary L. Weisling, West Bend, both of Wis.; Arthur Sternheimer, Spring Valley, N.Y.; Ralph A. Montes, Howell, and Douglas R. Schoen, North Brunswick, both of N.J., assignors to Block Drug Co., Inc., Jersey City, N.J.

Filed May 3, 1989, Ser. No. 346,912

Int. Cl.[5] G03B *21/64;* B32B *3/10*

U.S. Cl. 428—195 15 Claims



1. A device for mounting a transparency, said device comprising:

a front sheet of transparent plastic, said front sheet of transparent plastic comprising outer edges;

an opaque coating on said front sheet of transparent plastic, said opaque coating defining a first generally rectangular window, said first generally rectangular window having a first side, a second side, a third side, and a fourth side, said first generally rectangular window being of a size to permit said transparency to be viewed through said window but to substantially prevent light from leaking around said transparency; and

a back sheet of transparent plastic, said back sheet of transparent plastic comprising outer edges, said outer edges of said back sheet of transparent plastic being continuously bonded to said outer edges of said front sheet of transparent plastic, said back sheet of transparent plastic being continuously bonded to said front sheet of transparent plastic along said first, second, and third sides of said first generally rectangular window to form a pocket between said front sheet of transparent plastic and said back sheet of transparent plastic for receiving said transparency, said back sheet of transparent plastic itself comprising a slit, said slit having two ends, said ends of said slit being surrounded by said outer edges of said back sheet, said slit being located along said fourth side of said first generally rectangular window so as to provide an opening for inserting said transparency into said pocket.

4,988,557

FRAGRANCE SAMPLING DEVICE

Jack W. Charbonneau, Somerset, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 8, 1989, Ser. No. 447,928

Int. Cl.[5] A61L *9/04;* B01J *13/00;* D01F *1/02;* D04H *1/04*

U.S. Cl. 428—204 2 Claims

1. A liquid releasing device comprising two opposed flexible surfaces, and at least two zones between said surfaces having rupturable liquid-filled microcapsules therein, a first of said two zones having microcapsules bonded strongly to said two surfaces so that upon separation of the two surfaces said bonded microcapsules are ruptured, and a second of said two zones having microcapsules which are not bonded strongly to either surface so that upon separation of the surfaces there is little microcapsule rupturing and the remaining microcapsules in the second of the two zones can be removed from the surfaces by gentle rubbing.

4,988,558

LAMINATED FILM

Hiromi Shigemoto, Iwakuni, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,254

Claims priority, application Japan, Jun. 1, 1988, 63-135267

Int. Cl.[5] B32B *7/02*

U.S. Cl. 428—213 10 Claims

1. A laminated film comprising

(A) a layer of a polymer of 4-methyl-1-pentene,

(B) an interlayer of a mixture of (a) a polymer of 4-methyl-1-pentene and (b) an alpha-olefin copolymer comprising 10 to 85 mole % of propylene units, 3 to 60 mole % of 1-butene units and 10 to 85 mole % of units of an alpha-olefin having at least 5 carbon atoms, the proportions being based on the total amount of the propylene units, the 1-butene units and the other alpha-olefin units, having a crystallinity, determined by X-ray diffractometry, of not more than 20%, and

(C) a layer of a polyolefin derived from an alpha-olefin having 2 to 4 carbon atoms, as a main component,

the layers (A), (B) and (C) being laminated in the order stated.

4,988,559

SUPPORT SHEET FOR PHOTOGRAPHIC PRINTING SHEET

Hiroyuki Nemoto; Masahiro Kamiya, and Tsunehisa Shigetani, all of Tokyo, Japan, assignors to Oji Paper Co., Ltd., Tokyo, Japan

Filed Nov. 8, 1989, Ser. No. 433,100

Claims priority, application Japan, Nov. 15, 1988, 63-286789

Int. Cl.[5] B32B *27/32*

U.S. Cl. 428—219 14 Claims

1. A support sheet for photographic printing paper comprising:

a substrate sheet comprising a paper sheet;

coating layers formed on the two principal surfaces of the substrate sheet comprising a polyolefin resin; and

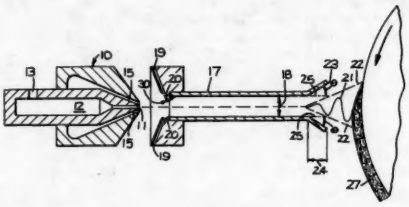
an adhesive layer, disposed between a surface of the substrate sheet and one of the coating layers formed on the surface of the substrate sheet, comprising a member of selected from the group consisting of hydroxyethyl cellulose and mixtures of hydroxyethyl cellulose and at least one organic compound having carboxyl groups, said adhesive layer enabling the peel strength between the substrate sheet surface and the coating layer to be controlled to a peel strength of 10 to 200 g/25.4 mm determined in accordance with ASTM D903-49.

4,988,560

ORIENTED MELT-BLOWN FIBERS, PROCESSES FOR MAKING SUCH FIBERS, AND WEBS MADE FROM SUCH FIBERS

Daniel E. Meyer, Stillwater, Minn.; Dennis L. Krueger, Hudson, Wis., and Hassan Bodaghi, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 21, 1987, Ser. No. 135,693
Int. Cl.[5] D04H *1/52, 1/54, 1/72, 1/74*
U.S. Cl. 428—297 10 Claims



1. Nonwoven fabric comprising oriented microfibers having an average diameter of about 10 micrometers or less and crimped staple fibers blended with the microfibers to form a coherent handleable lofty resiliently compressible web.

4,988,561

PAPER COATED WITH SYNTHETIC ALKALI METAL ALUMINOSILICATES

Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 297,738, Jan. 17, 1989, which is a continuation of Ser. No. 875,120, Jun. 17, 1986, said Ser. No. 297,738, is a continuation-in-part of Ser. No. 116,805, Nov. 3, 1987, Pat. No. 4,812,299. This application May 31, 1990, Ser. No. 531,475
Int. Cl.[5] B32B *5/16;* C01B *33/28;* B05D *1/36;* C04B *7/02*
U.S. Cl. 428—331 8 Claims

1. A paper containing a coating-effective amount of a paper coating comprising an alkali metal alumino-silicate having a composition in terms of mole ratio of oxides as follows:

$$xM_2O:Al_2O_3:ySiO_2:zH_2O$$

where x is the number of moles of alkali metal oxide, M is an alkali metal, y is the number of moles of SiO_2 associated with the alkali metal aluminosilicate compositions, and z is the number of moles of bound water, and having the morphology of rimmed particles as depicted in any one of TEM FIGS. 18-23.

4,988,562

MAGNETIC RECORDING MEDIA

Katsumi Ryoke; Masatoshi Takahashi, and Akihiro Hashimoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 18, 1988, Ser. No. 259,366
Claims priority, application Japan, Oct. 19, 1987, 62-264723
Int. Cl.[5] G11B *23/00*
U.S. Cl. 428—323 6 Claims

1. A magnetic recording medium comprising a non-magnetic support having thereon a magnetic layer comprising a ferromagnetic powder, a binder and carbon black, said carbon black being a mixture which contains high structure furnace carbon black and acetylene black in the weight ratio of the former to the latter of from 90/10 to 70/30, said high structure furnace carbon black having properties satisfying the general equations (I) or (II) below:

$$0<X\leqq 120,\ Y\geqq 0.625X+75 \quad \text{(I)}$$

$$X>120,\ Y\geqq 0.01125X^2-2.005X+229 \quad \text{(II)}$$

wherein Y is the amount of DBP oil adsorbed (Ml/100 grams) by said high structure carbon furnace black, X is the specific surface area (m^2/gram) of said high structure carbon furnace black, Y≧120, and said acetylene black has properties satisfying the general equations (III) and (IV) below:

$$0<Z\leqq 120,\ W\geqq 0.625Z+75 \quad \text{(III)}$$

$$Z>120,\ W\geqq 0.01125Z^2-2.005Z+229 \quad \text{(IV)}$$

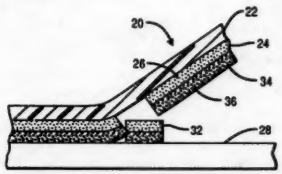
wherein W is the amount of DBP oil adsorbed (ml/100 grams) by said acetylene black, Z is the specific surface area (m^2/gram) of said acetylene black, and W≧120.

4,988,563

THERMAL TRANSFER RIBBON WITH PROTECTIVE LAYER

Mary A. Wehr, 2377 Oxford-Middletown Rd., Hamilton, Ohio 45013

Filed May 10, 1988, Ser. No. 192,795
Int. Cl.[5] B41M *5/26*
U.S. Cl. 428—341 9 Claims



1. A thermal transfer ribbon comprising a substrate, a thermal sensitive coating covering the substrate on one side thereof and which thermal sensitive coating is a mixture containing as essential ingredients about 5 to 35% hydrocarbon wax, about 25 to 65% paraffin wax, about 5 to 35% carnauba wax, binding material of about 5 to 25% ethylene vinyl acetate copolymer, sensible material of about 1 to 55% iron oxide, a pigment of about 1 to 35% black amorphous powder and a transfer agent of about 1 to 25% sucrose benzoate, all by dry weight, and a protective layer covering the thermal sensitive coating on the side thereof distal from the substrate and containing as essential ingredients binding material of about 10 to 60% ethylene vinyl acetate copolymer and about 40 to 90% paraffin wax, by dry weight.

4,988,564

METAL CARBIDE, NITRIDE, OR CARBONITRIDE WHISKERS COATED WITH METAL CARBIDES, NITRIDES, CARBONITRIDES, OR OXIDES

Charles D'Angelo, Southboro; Joseph G. Baldoni, II, Norfolk, and Sergej-Tomislav Buljan, Acton, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 899,835, Aug. 25, 1986, Pat. No. 4,810,530. This application Nov. 16, 1988, Ser. No. 272,029
Int. Cl.[5] B32B *18/00, 9/00;* D02G *3/00*
U.S. Cl. 428—368 6 Claims

1. A coated single crystal whisker consisting essentially of:

a single crystal whisker of a carbide, nitride, or carbonitride of one or more metals selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, and W, having an aspect ratio of length to diameter of about 5:1 to 500:1, and a diameter of about 0.5–10 microns; and

one or more adherent coating layers on the whisker surface, wherein each layer is independently selected from the group consisting of carbides, nitrides, and carbonitrides of Ti, Zr, Hf, Nb, Ta, and W, and oxides of Al, Zr, and Hf,

or a mixture or solid solution thereof, and wherein each layer is of a different material than the material on which it is deposited, the total combined thickness of said coating layers being between a monomolecular layer and about one-half the diameter of said single crystal whisker.

4,988,565

POLYMER MIXTURE COMPRISING A POLYPHENYLENE ETHER, A BLOCK COPOLYMER, A PHOSPHATE ESTER AND ADDITIVES

Johannes W. J. De Munck, Huybergen, and Johannes H. G. M. Lohmeijer, Hoogerheide, both of Netherlands, assignors to GE Plastics, Selkirk, N.Y.

Division of Ser. No. 26,593, Mar. 17, 1987. This application Oct. 17, 1989, Ser. No. 422,824

Claims priority, application Netherlands, Mar. 17, 1986, 8600670

Int. Cl.[5] C08L *71/12;* D03G *3/00*

U.S. Cl. 428—373 10 Claims

1. A cable which includes a sheath formed of a polymer mixture which comprises:

(a) 30% by weight to 40% by weight polyphenylene ether resin;

(b) 30% by weight to 40% by weight block copolymer; and

(c) 20% by weight to 35% by weight phosphate ester, the sum of said constituents being 100% by weight, wherein the mixture does not comprise a crosslinking agent.

4,988,566

FLUOROCARBON POLYMER COMPOSITIONS AND ARTICLES SHAPED THEREFROM

Frank J. Glaister, 18 Mulholland Dr., Ipswich, Mass. 01938

Division of Ser. No. 19,345, Feb. 26, 1987, Pat. No. 4,844,982, which is a division of Ser. No. 762,791, Aug. 2, 1985, Pat. No. 4,666,642, which is a continuation of Ser. No. 549,500, Nov. 7, 1983, abandoned. This application Apr. 14, 1989, Ser. No. 339,116

Int. Cl.[5] C08L *27/12;* B32B *9/00, 27/00*

U.S. Cl. 428—407 2 Claims

1. A composition comprising a mixture of ethylene tetrafluoroethylene copolymer, polyvinylidene fluoride and a crosslinking promoter, wherein said polyvinylidene fluoride is in an amount of 1.0% by wt. to 50% by wt.; said mixture being a preparation of pellets of crosslinkable ethylenetetrafluoroethylene and pellets of polyvinylidene fluoride which has been coated with a liquid crosslinking promoter, further coated with powdered polyvinylidene fluoride, and blended.

4,988,567

HOLLOW ACID-FREE ACRYLATE POLYMERIC MICROSPHERES HAVING MULTIPLE SMALL VOIDS

Joaquin Delgado, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 485,630, Feb. 27, 1990, Pat. No. 4,968,562. This application Jul. 25, 1990, Ser. No. 547,282

Int. Cl.[5] B32B *5/16*

U.S. Cl. 428—402 8 Claims

1. A process for preparing an aqueous suspension comprising hollow, polymeric, acrylate, inherently tacky, infusible, solvent-insoluble, solvent-dispersible, elastomeric, nitrogen-containing, acid-free pressure-sensitive adhesive microspheres having an average diameter of at least about 1 micrometer wherein a majority of said microspheres contain multiple interior voids, a majority of said voids having a diameter of less than about 10% of the diameter of the microsphere, the total of the void diameters being at least about 10% of the diameter of said hollow microsphere, said process comprising the steps of:

(a) forming a water-in-oil emulsion of a water phase selected from the group consisting of water and aqueous solutions of at least one nitrogen-containing polar monomer in at least one oil phase monomer selected from the group consisting of alkyl acrylate and alkyl methacrylate esters;

(b) forming a water-in-oil-in-water emulsion by dispersing the water-in-oil emulsion into an aqueous phase containing an emulsifier having a hydrophilic-lipophilic balance value of at least about 6; and

(c) initiating polymerization.

4,988,568

HYDROPHILIC FINE GEL PARTICLES AND PROCESS FOR PRODUCTION THEREOF

Jun Hasegawa, Kamakura; Haruki Oikawa, Yokohama; Osamu Kobayashi, Yokohama; Yasuo Kataoka, Yokohama, and Masayoshi Sekiya, Tokyo, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,567

Claims priority, application Japan, Mar. 30, 1988, 63-77910

Int. Cl.[5] B32B *5/16;* C08F *226/02*

U.S. Cl. 428—402 8 Claims

1. Hydrophilic fine gel particles, said particles being crosslinked polymer particles comprising 20–94.8% by weight of a monoethylenically unsaturated amide monomer, more than 10 and up to 50.0% by weight of a crosslinkable ethylenically unsaturated monomer, 0.1–30% b weight of an ethylenically unsaturated carboxylic acid, 0.1–50% by weight of an ester monomer of an acrylic or methacrylic acid, and 0–30% by weight of a monomer copolymerizable with the above-mentioned monomers, said particles having a particle diameter in a water-swollen state of 0.1–10 μm and a weight-average particle diameter/number-average particle diameter ratio of 1.2 or less.

4,988,569

COMPLEX PHOSPHATE ADSORBENT OF MGO–TIO_2

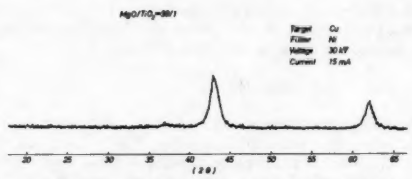
Susumu Okazaki, Mito; Hiroshi Endo, Chofu, and Kuniaki Hino, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 24, 1988, Ser. No. 235,415

Claims priority, application Japan, Aug. 25, 1987, 62-210713; Aug. 25, 1987, 62-210714

Int. Cl.[5] B32B *5/16;* B01D *11/00*

U.S. Cl. 428—403 13 Claims



1. A phosphate adsorbent comprising an MgO-TiO_2 complex as an active ingredient in which the MgO/TiO_2 molar ratio of said complex is 99.99/0.01 to 80/20.

4,988,570

PROCESS FOR FORMING A FILM

Masakazu Ueikita, Kobe, Japan, assignor to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 267,593, Nov. 7, 1988, abandoned, which is a division of Ser. No. 905,415, Sep. 10, 1986, Pat. No. 4,801,420. This application Nov. 9, 1989, Ser. No. 434,628

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[5] B32B *9/04;* B05D *1/20*

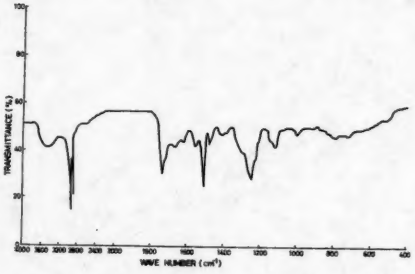
U.S. Cl. 428—411.1 5 Claims

1. A built-up film formed by a Langmuir-Blodgett technique from a polymer which consists essentially of:

(i) a skeleton of linear repeating units, wherein each of said linear repeating units are composed of a first organic group R_1 and a second organic group R_2, each of R_1 and R_2 being at least divalent and having at least two carbon atoms, R_1 and R_2 being connected with each other by a divalent bonding group formed by reaction of an acidic

group containing a heteroatom and a basic group containing a heteroatom, and

(ii) at least one group selected from hydrocarbon-containing groups R_3 and R_4 and bonded to the linear repeating units by covalent bonding, wherein each of R_3 and R_4 is independently a hydrocarbon-containing group of 10 to 30 carbon atoms which may contain substituent groups, with the proviso that when any one of the groups selected from R_3 and R_4 has 10 or 11 carbon atoms, then said group selected from R_3 and R_4 and having 10 or 11 carbon atoms must contain fluorine as said substituent groups.



4,988,571

DOUBLE-LAYERED PHOTOSENSITIVE MEMBER WITH POLYCARBONATE RESIN

Hidpaki Ueda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 14, 1989, Ser. No. 310,605

Claims priority, application Japan, Feb. 15, 1988, 63-32350

Int. Cl.[5] B32B *27/36;* **G03G** *5/06*

U.S. Cl. 428—412 **13 Claims**

1. A photosensitive member comprising:

an electrically conductive substrate;

a charge generating layer;

a charge transporting layer containing at least a charge transporting material, a polycarbonate resin I of first type having a mean molecular weight of $2–4\times10^4$ and a polycarbonate resin II of second type having a mean molecular weight of $4–6.5\times10^4$, said polycarbonate resin I contributing between 5 and 50 parts by weight of the combined ratio of polycarbonate resins I and II.

4,988,572

COATING COMPOSITION

Alan Butters, and Graham A. Page, both of Ipswich, England, assignors to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 32,400, Mar. 31, 1987, Pat. No. 4,857,568. This application Jun. 30, 1989, Ser. No. 373,390

Claims priority, application United Kingdom, Apr. 21, 1986, 8609704

Int. Cl.[5] C08K *5/13;* **C08L** *63/00;* **B32B** *27/30, 27/38*

U.S. Cl. 428—413 **4 Claims**

4. A composition for coating a plastics substrate wherein the composition comprises a polymeric amine, a polyepoxy resin, an etchant for the substrate and a vinyl polymer, the polymeric amine, polyepoxy resin and etchant being present in the composition in a weight ratio of 10 to 1:1.0:450 to 1, the polymeric amine being poly(ethyleneimine), the polyepoxy resin being a bisphenol A-epichlorohydrin condensate and the etchant being a halogenated phenol, wherein the vinyl polymer is selected from the group consisting of a vinyl pyrrolidone polymer, a vinyl chloride polymer and a partially hydrolysed vinyl chloride-vinyl acetate copolymer.

4,988,573

MEDIUM RELATED MEMBERS

Masatoshi Nakayama; Kunihiro Ueda, and Masatoshi Okamura, all of Saku, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,344

Claims priority, application Japan, Jul. 14, 1988, 63-175686; Jul. 14, 1988, 63-175687

Int. Cl.[5] B32B *27/06*

U.S. Cl. 428—421 **2 Claims**

1. A recording and/or reproducing medium related member which constructs or is disposed in a casing in which a tape or disk-shaped medium is received for travel or rotating motion and is in sliding contact with said tape or disk-shaped medium, wherein

a plasma-polymerized film is formed on a surface of said member wherein said film contains C, F and at least one element of Si, B, P, and N, the total content of F and at least one element of Si, B, P, and N ranging from 5 to 40 atom % of the film, and the atomic ratio of $(Si+B+P+N)/F$ ranging from 2/10 to 5/1.

4,988,574

THERMOPLASTIC POLYURETHANES HAVING IMPROVED BINDER PROPERTIES FOR MAGNETIC MEDIA RECORDING

Walter T. Murphy, Cuyahoga Falls; Hsiungto S. Tseng, Westlake, and Edmond G. Kolycheck, Lorain, all of Ohio, assignors to The BFGoodrich Company, Akron, Ohio

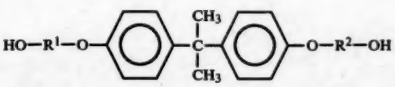
Filed Feb. 8, 1989, Ser. No. 308,061

Int. Cl.[5] G11B *5/00*

U.S. Cl. 428—425.9 **18 Claims**

1. A magnetic tape having good dispersibility of magnetic particles with a polyesterurethane resin binder, comprising:

a substrate, magnetic particles, and a binder bonding said magnetic particles to said substrate, said binder consisting essentially of the reaction product of a polyisocyanate and a blend of hydroxyl terminated polyester intermediate and a derivative of a bisphenol-A chain extender, said polyester intermediate being made from a dicarboxylic acid or an anhydride thereof wherein the hydrocarbon portion is an aliphatic having from 2 to 18 carbon atoms, and from a glycol having a total of from 4 to 10 carbon atoms, said chain extender having the formula



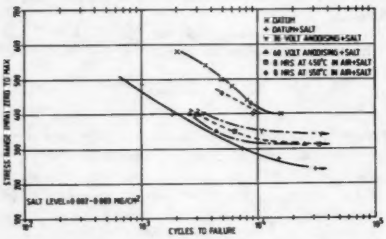
wherein R^1 and R^2, independently, is an alkylene having from 2 to 4 carbon atoms.

4,988,575

METHOD OF PROVIDING TITANIUM AND ALLOYS THEREOF WITH A PROTECTIVE COATING

David F. Bettridge, Derby; Terence P. Cunningham, Nottingham, and Brian W. Forman, Burton, all of England, assignors to Rolls-Royce plc, London, England

Continuation of Ser. No. 237,712, Aug. 29, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,450
Int. Cl.[5] C23C 8/10; B32B 9/00
U.S. Cl. 428—469 6 Claims



1. A method of providing a component surface formed from titanium or a titanium based alloy having titanium as the major constituent thereof with a protective coating comprising the steps of subjecting said surface to a cleaning operation in order to remove any contaminants therefrom and subsequently heating said surface in clean air at a temperature within the range of 500–550° C. for sufficient time to produce an adherent oxide layer on said surface which is capable of inhibiting any subsequent corrosion of said surface.

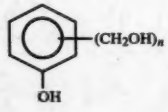
4,988,576

WOOD PRESERVATIVE

Stephen Y. Lin, Wausau, and Lori L. Bushar, Mosinee, both of Wis., assignors to Daishowa Chemicals Inc., Rothschild, Wis.

Filed Dec. 13, 1989, Ser. No. 450,591
Int. Cl.[5] B27K 3/00, 3/38
U.S. Cl. 428—537.1 13 Claims

1. As a composition of matter, a novel wood preservative composition containing a graft copolymer of lignosulfonate, hydroxyl benzyl alcohol and a metal salt or a mixture of metal salts in the ratio of from 1:0:0.01 to 1:0.5:1.2, respectively, said graft copolymer is a reaction product of lignosulfonate and acrylic monomers of the general formula: $RCH{=}CR^1COOH$, where R is hydrogen, an alkyl or carboxyl group and R^1 is hydrogen or an alkyl group; said hydroxyl benzyl alcohol has the general formula:



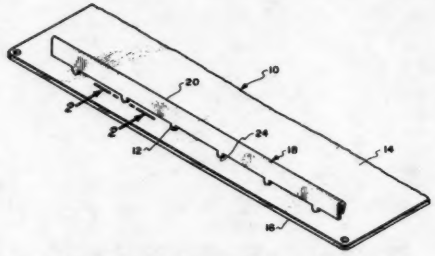
where n is an integer from 1 to 3; and said metal salt is a salt of sulfate, chloride, phosphate or carbonate wherein the metal is selected from the group of copper, zinc, mercury and lead.

4,988,577

PRINTED CIRCUIT BOARD STIFFENER

John A. Jamieson, Downey, Calif., assignor to Bussco Engineering, Inc., El Segundo, Calif.

Filed Jun. 8, 1989, Ser. No. 363,278
Int. Cl.[5] B32B 3/02, 3/06
U.S. Cl. 428—573 4 Claims



1. A printed circuit board stiffener comprising:

an elongated bar, said elongated bar being rigid, said elongated bar being narrow;

a plurality of pins integrally connected to said elongated bar, said pins being spaced apart and extending outwardly from said elongated bar, each said pin adapted to be inserted within a close conforming hole formed within a printed circuit board, each said pin including frangible means, said frangible means permitting the deforming of each said pinion application of a sufficiently powerful striking force causing collapsing and lateral expansion of each said pin; and

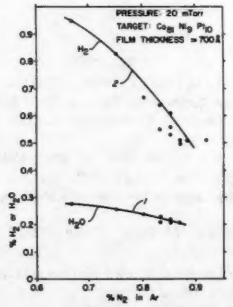
said frangible means including a plurality of notches formed within the side walls of each said pin.

4,988,578

METHOD FOR MANUFACTURING A THIN FILM MAGNETIC RECORDING MEDIUM

Tsutomu T. Yamashita; Ching-Cheng Shir, both of San Jose, and Tu Chen, Saratoga, all of Calif., assignors to Komag, Inc., Milpitas, Calif.

Continuation of Ser. No. 178,413, Apr. 6, 1988, abandoned, which is a division of Ser. No. 838,220, Mar. 10, 1986, Pat. No. 4,749,459. This application Feb. 22, 1990, Ser. No. 485,797
Int. Cl.[5] G11B 5/64, 5/82
U.S. Cl. 428—678 11 Claims



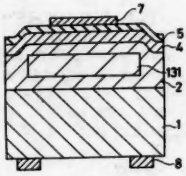
1. A film of magnetic recording media, said film being an alloy based on cobalt and including platinum, said film being doped with nitrogen, the amount of oxygen in said alloy, if any, being controlled to a value sufficiently low so as to have substantially no effect on the coercivity of said media.

4,988,579

ELECTROLUMINESCENT DEVICE OF COMPOUND SEMICONDUCTOR

Yoshitaka Tomomura, and Masahiko Kitagawa, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 19, 1989, Ser. No. 382,237
Claims priority, application Japan, Jul. 21, 1988, 63-182664; Sep. 26, 1988, 63-240556
Int. Cl.[5] H01L *33/00*
U.S. Cl. 428—690 21 Claims



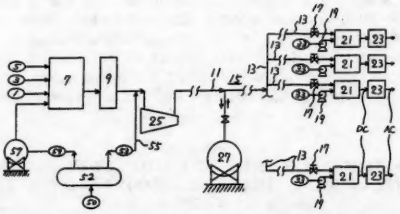
1. An electroluminescent device of compound semiconductor which comprises an electroluminescent device body formed on a substrate and providing a light-emitting portion and a conductive portion joined to the lower surface and/or the upper surface of the light-emitting portion, and a pair of electrodes for applying therethrough an external voltage to the body to cause electroluminescence, the conductive portion comprising a conductive layer formed of a Group II - VI compound semiconductor made to have a substantially low resistance by the addition of an impurity element, and a conductive layer part provided in the conductive layer and formed of a Group II - VI compound semiconductor having a higher refractive index than the Group II - VI compound semiconductor of the conductive layer and containing an impurity element added thereto, the conductive layer part being so shaped as to confine thereto the light produced by the light-emitting portion.

4,988,580

FUEL CELL POWER GENERATING SYSTEM

Kozo Ohsaki, Chiba; Mitsuo Okada, Tokyo, and Shima Kazumi, Chiba, all of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 424,890
Claims priority, application Japan, Oct. 26, 1988, 63-270264
Int. Cl.[5] H01M *8/06*
U.S. Cl. 429—19 6 Claims



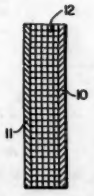
1. A fuel cell power generating system comprising:
a hydrogen-generating plant comprising
a reformer for converting a fuel substance into a gas containing hydrogen gas as a principal component, and
a purifier for processing the gas produced by the reformer to obtain substantially pure hydrogen gas;
a plurality of fuel cell power generating units distributed at sites remote from the hydrogen-generating plant and operated according to power demand; and
piping for distributing the hydrogen gas generated by the hydrogen-generating plant to the fuel cell power generating units and for storing the hydrogen gas, comprising a main pipe connected to the hydrogen-generating plant, a plurality of branch pipes connecting the fuel cell power generating units to the main pipe, and valves provided on the branch pipes to regulate the pressure and flow rate of the hydrogen gas.

4,988,581

METAL-AIR BIPOLAR CELL UNIT

Paul A. Wycliffe, Kingston, Canada, assignor to Alcan International Limited, Montreal, Canada

Filed Jul. 19, 1989, Ser. No. 382,533
Int. Cl.[5] H01M *4/86*
U.S. Cl. 429—27 8 Claims



1. A bipolar cell unit for a metal/air battery comprising an (a) air cathode having opposed major surfaces, one of said surfaces being exposed to air and the other of said surfaces being adapted for exposure to electrolyte, (b) a metal anode comprising a metal plate having opposed major surfaces with one plate major surface positioned in spaced juxtaposed relation to said cathode surface exposed to air thereby forming an air gap between the anode and cathode, (c) an air permeable, hydrophobic, nonconducting foam material connecting said air cathode to said anode plate whereby the air cathode is supported by the anode plate such that air is permitted to move through said air gap while electrolyte is excluded and (d) an electrical connection between the anode and cathode.

4,988,582

COMPACT FUEL CELL AND CONTINUOUS PROCESS FOR MAKING THE CELL

Christopher K. Dyer, Chatham, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed May 4, 1990, Ser. No. 521,115
Int. Cl.[5] H01M *8/10*
U.S. Cl. 429—30 20 Claims

1. A continuous method for fabricating an elongated assembly from which multiple individual fuel cell assemblies are made, comprising the steps of
simultaneously forming on the respective surfaces of an elongated carrier element electrodes that are impermeable to a fuel and an oxidizer,
simultaneously forming on the respective surfaces of said electrodes solid-electrolyte layers that consist essentially of an electronically insulating material that is also ionically conducting to at least a first ionic species and which material is permeable to the fuel, to the oxidizer and to the

products of electrochemical reactions of the fuel and oxidizer,

and simultaneously forming on the respective surfaces of said solid-electrolyte layers electrodes that are permeable to the fuel and the oxidizer.

4,988,583

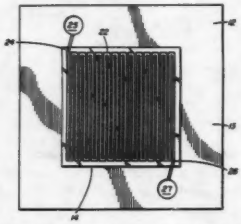
NOVEL FUEL CELL FLUID FLOW FIELD PLATE

David S. Watkins, Coquitlam; Kenneth W. Dircks, North Vancouver, and Danny G. Epp, Delta, all of Canada, assignors to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Aug. 30, 1989, Ser. No. 400,734

Int. Cl.[5] H01M *8/10*

U.S. Cl. 429—30 **36 Claims**



1. A fluid flow field plate for use in a solid polymer electrolyte fuel cell, said plate being made of a suitable electrically conducting material and formed in a major surface thereof a single continuous open-faced fluid flow channel, said channel having a fluid inlet at one end and a fluid outlet at the other end, wherein said channel traverses a major central area of said surface in a plurality of passes, and wherein said plate further includes a fluid supply opening and a fluid exhaust opening defined in said surface and directly connected to said fluid inlet and to said fluid outlet, respectively.

4,988,584

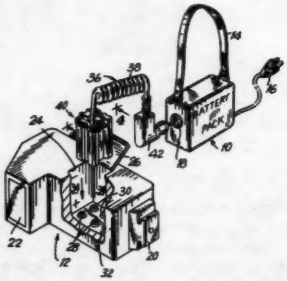
LOCKABLE POWER MODULE AND METHOD, PARTICULARLY FOR ELECTRONIC FLASH UNITS

Richard Shaper, Old Brookville, N.Y., assignor to Quantum Instruments, Inc., Garden City, N.Y.

Filed Oct. 2, 1989, Ser. No. 415,706

Int. Cl.[5] H01M *2/00*

U.S. Cl. 429—50 **13 Claims**



1. An arrangement for supplying electrical power from an external electrical power source to a battery-powered electrical device having walls bounding a battery compartment from which the batteries have been removed, and electrical power terminals located within the compartment, said arrangement comprising:

(a) a power module having electrical contacts and insertable into the compartment to a position of use in which the contacts engage the terminals;

(b) conductor means connected between the power source and the module, for conveying electrical power from the source to the device when the module is in the use position; and

(c) locking means on the module, and operative for lockingly engaging the compartment walls to lock the module within the compartment.

4,988,585

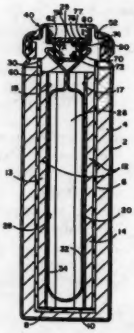
LIQUID CATHODE ELECTROCHEMICAL CELLS HAVING INSURED ANODE TO TAB CONTACT

Thomas J. O'Hara, Bay Village; Alan D. Ayers, Westlake, and Manuel R. Malay, Brunswick, all of Ohio, assignors to Eveready Battery Company, Inc., St. Louis, Mo.

Filed Feb. 2, 1989, Ser. No. 306,417

Int. Cl.[5] H01M *4/72*

U.S. Cl. 429—66 **39 Claims**



1. An electrochemical cell comprising a container having disposed therein a cathode collector, a separator, a liquid cathode-electrolyte, an active metal anode which is consumable during discharge of the cell, a means for collecting current for the active metal anode, and a means for biasing the active metal anode and current collecting means radially outward; wherein said cathode collector is disposed proximate to the interior wall of the container, said separator is disposed within and in surface contact with the cathode collector, said active metal anode is disposed within and in contact with the separator, said current collecting means is disposed within and in contact with the active metal anode, said anode current collecting means having means for exposing a portion of the active metal anode to direct contact with the biasing means and said biasing means is disposed within the anode current collecting means and in contact with the active metal anode.

4,988,586

METHOD FOR THE PREVENTION OF FUSARIUM DISEASES AND MICROORGANISMS USED FOR THE SAME

Hideyoshi Toyoda, Hirakata, and Ryutaro Utsumi, Nara, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Jul. 10, 1987, Ser. No. 72,130

Claims priority, application Japan, Jul. 11, 1986, 61-164335; Feb. 13, 1987, 62-32269; Feb. 13, 1987, 62-32270; Feb. 13, 1987, 62-32271

Int. Cl.[5] A61K *37/00*; C12N *15/00, 1/20, 1/12*

U.S. Cl. 424—93 **6 Claims**

1. A method for the prevention of Fusarium diseases in a plant, comprising:

applying a microorganism capable of decomposing fusaric acid to said plant or to the soil around said plant, wherein

said microorganism is *Cladosporium werneckii* DK2011 (FERM BP-1383).

4,988,587

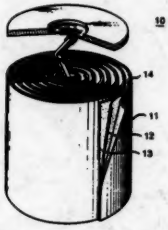
RECHARGEABLE NON-AQUEOUS CELL

Leonard W. Ter Haar, Berkeley Heights, and Forrest A. Trumbore, Summit, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 286,433, Dec. 19, 1988, abandoned. This application Feb. 23, 1990, Ser. No. 484,473

Int. Cl.[5] H01M *10/40, 4/58*

U.S. Cl. 429—194 **20 Claims**



14. A nonaqueous cell comprising a lithium negative electrode, a separator, a positive electrode comprising niobium triselenide active material, an electrolyte, and means for making electrical contact with the negative and the positive electrode,

CHARACTERIZED IN THAT

the positive electrode is made by a procedure that comprises the steps of

(a) at least once depositing a liquid slurry comprising Nb_2Se_9 powder on the substrate and removing the liquid from the deposited slurry to form a dry coating of Nb_2Se_9 powder thereon, said slurry comprising from 10 to 90 weight percent of Nb_2Se_9, (b) heating the substrate with the said coating at a temperature within a range of from 625° and 780° C. and for a period of time ranging from one minute to 25 hours, said temperature and period of time being sufficient to form a layer of fibrous material comprising $NbSe_3$, and (c) using the so-formed fibrous material with or without a metal support therefor as the positive electrode.

4,988,588

MINIATURE POROUS ELECTRODE AND METHOD OF MAKING

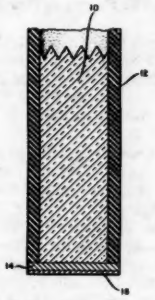
Charles W. Walker, Jr., Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 24, 1990, Ser. No. 527,964

Int. Cl.[5] H01M *4/02*

U.S. Cl. 429—209 **4 Claims**

1. A miniature porous electrode for electrochemical studies comprising a conductive rod that is sheathed in electrical insulation except for the cross sectional area at one end of the rod, a thin layer of conductive epoxy coating on said cross sectional area and a porous electrochemically active material for electrochemical study in contact with the conductive



epoxy and electrical leads attached to the opposite end of the rod.

4,988,589

PASTE-TYPE CADMIUM ELECTRODE FOR USE IN AN ALKALINE STORAGE CELL AND ITS MANUFACTURING METHOD

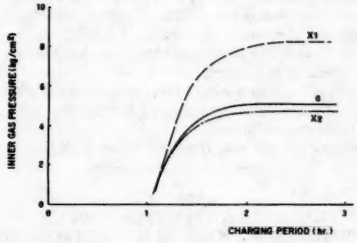
Takahisa Awajitani; Masayuki Terasaka; Masakazu Takemura, and Hironori Honda, all of Sumoto, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Jan. 17, 1990, Ser. No. 466,530

Claims priority, application Japan, Jan. 18, 1989, 1-10309; May 18, 1989, 1-124915

Int. Cl.[5] H01M *4/38*

U.S. Cl. 429—222 **11 Claims**



1. A paste-type cadmium electrode for use in an alkaline storage cell, comprising:

a conductive substrate;

an active material layer mainly comprising cadmium oxide and formed on a surface of said conductive substrate; and

a conductive layer formed on a surface of said active material layer, said conductive layer having therein powdered carbon and powdered alkali-resistant metal having a surface area of 0.001 to 0.05 m^2 against 1 g of said active material.

4,988,590

ULTRAFAST ROASTED COFFEE

Sankey E. Price, Goshen; Richard F. Kussin; Robert J. Fruhling, both of Cincinnati, and Marva B. Harris, Westchester, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 621,937, Jun. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 516,414, Jul. 22, 1983, abandoned. This application Oct. 21, 1985, Ser. No. 789,927

Int. Cl.[5] A23F *5/04*

U.S. Cl. 426—595 23 Claims

1. A process for preparing a coffee product comprising:

(1) roasting green coffee beans in a fluidized bed roaster in from about 30 seconds to about 120 seconds at temperatures of from about 550° F. to 750° F. to a color of from about 19 to about 23 Hunter "L" units, wherein the surfaces of the roasted beans are not more than 10 Hunter "L" units different in color from the average color throughout the beans and wherein the level of fluidization during roasting is from about 9 to about 14 pounds of hot air per pound of green coffee per minute;

(2) air quenching the roasted coffee to a temperature of less than 300° F. at a level of fluidization of from about 15 to about 20 pounds of air per pound of roasted coffee per minute; and

(3) grinding the quenched and cooled coffee in a manner such that the overall color of the ground coffee is from about 19 to about 23 Hunter "L" units;

to yield a coffee which when brewed has improved holding quality.

12. A product made according to claim 1.

4,988,591

PROCESS FOR PRODUCING COLOR IMAGES

Detlef Winkelmann, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,407

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815538

Int. Cl.[5] G03G *13/01*

U.S. Cl. 430—43 16 Claims

1. A process for producing screened color images electrophotographically for the color proofing method by means of toner image transfer, which comprises the steps of

(a) providing an adhesive material comprising a base and a multi-ply adhesive layer with at least one more strongly adhering layer and at least one less strongly adhering layer, (b) transferring a plurality of toner images of different colors successively from a photoconductor to said adhesive layer with application of pressure by a pair of rollers exerting a linear pressure in the range from about 10 N/cm to 200 N/cm,

(c) transferring said adhesive layer together with said plurality of toners of different colors adhering thereto to a final receiving material, and

(d) peeling off said base from said adhesive layer.

4,988,592

PHOTOSENSITIVE MEMBER CONTAINING PHTHALOPERINONE OR NAPHTHALIMIDE

Mitsutoshi Sakamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

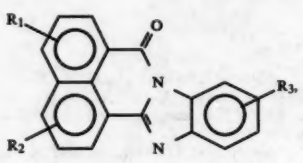
Filed Oct. 4, 1989, Ser. No. 417,186

Claims priority, application Japan, Oct. 5, 1988, 63-252624

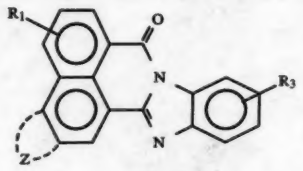
Int. Cl.[5] G03G *5/14*

U.S. Cl. 430—58 13 Claims

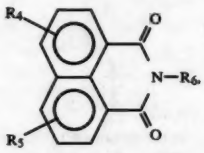
1. A photosensitive member having a laminated photosensitive layer constituted of a charge generating layer and a charge transporting layer on an electrically conductive substrate, wherein the charge generating layer comprises a charge generating material and an additive selected from the group consisting of a phthaloperinone compound represented by the general formula [I] below, a phthaloperinone compound represented by the general formula [I'] below, a naphthaline compound represented by the general formula [II] and a naphthalimide compound represented by the general formula [II'] below:



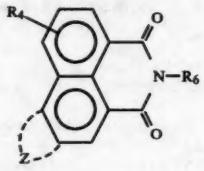
[I]



[I']



[II]



[II']

wherein R_1, R_2, R_3, R_4 and R_5 are respectively a hydrogen atom, an alkyl group, an amino group, a hydroxy group, a halogen atom, a nitro group, or a cyano group; R_6 is a hydrogen atom, an alkyl group or an aryl group; Z is a residual group forming a condensed aromatic cyclic ring with a benzene ring and Z may have a substituent.

4,988,593

AZO COMPOUND CONTAINING ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER

Hideyuki Takai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

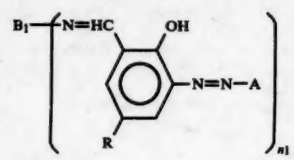
Filed Sep. 20, 1989, Ser. No. 409,785

Claims priority, application Japan, Oct. 3, 1988, 63-250251

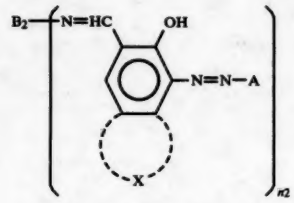
Int. Cl.[5] G03G *5/047, 5/06*

U.S. Cl. 430—58 6 Claims

1. An electrophotographic photosensitive member comprising: an electroconductive support and a photosensitive layer formed on said support, said photosensitive layer containing an azo pigment expressed by a general formula [I] or [II]:



[I]



[II]

where A, B_1 and B_2 are each aromatic hydrocarbon nucleus groups, optionally linked by coupler groups or heterocyclic groups, optionally linked by coupler groups, A is an univalent group, B_1 is an univalent, bivalent or trivalent group, and B_2 is a bivalent or trivalent group; X is a residue necessary for forming a polycyclic aromatic nucleus or a heterocycle by condensation with a benzene nucleus; R is a halogen atom, an alkyl group or an alkoxy group; n_1 is an integer from 1 to 3; and n_2 is an integer from 1 to 3.

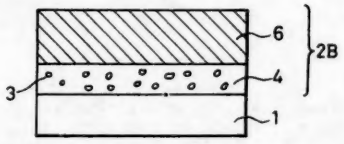
2. An electrophotographic photosensitive member according to claim 1, wherein said photosensitive layer is a laminate of a charge generation layer and a charge transport layer.

4,988,594

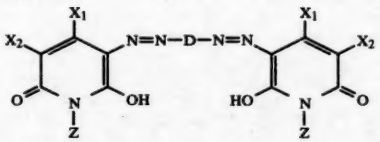
DIAZO PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY

Yoshimasa Hattori; Noboru Furusho; Youichi Nakamura, and Masami Kuroda, all of Kawasaki, Japan, assignors to Fuji Electric Co. Ltd., Kanagawa, Japan

Filed Jul. 26, 1989, Ser. No. 385,316
Int. Cl.[5] G03G *5/047, 5/06*
U.S. Cl. 430—59 **6 Claims**

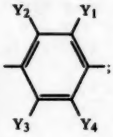


1. A photoconductor for electrophotography, comprising:
an electroconductive substrate; and
a photoconductive layer formed on said electroconductive substrate and including a charge generating substance comprised of at least one disazo compound represented by general formula (I):



(I)

wherein X1 is selected from the group consisting of an alkyl group, an aryl group and an aromatic heterocyclic group, each of which groups may be substituted, X2 is selected from the group consisting of a hydrogen atom, a cyano group, a carbamoyl group, a carboxyl group, an ester group and an acyl group, and Z is selected from the group consisting of a hydrogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, an aryl group and an aromatic heterocyclic group, each of which groups may be substituted, and —N=N—D—N=N— is a disazo residual group in which —D— is a structure represented by one of the following formulae:



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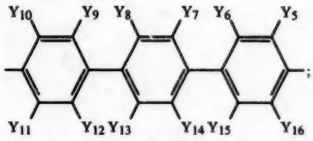

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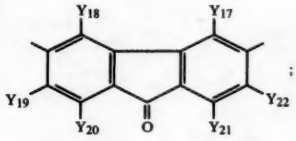

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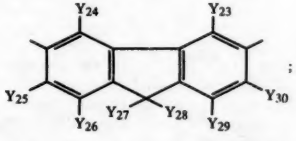

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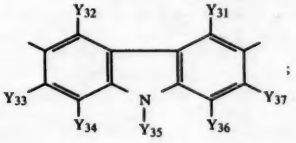

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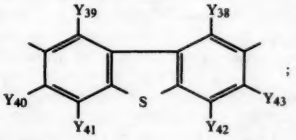

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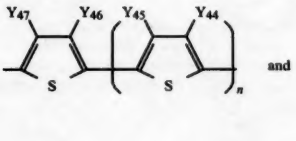

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and

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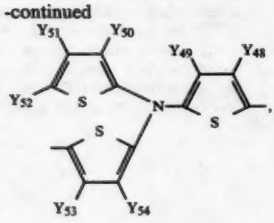
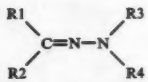
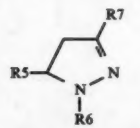


wherein each of Y1 to Y54 is selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an acyl group, an aryl group, an aromatic heterocyclic group, each of which groups may be substituted, and a nitro group, and n is an integer of from 0 to 6.

2. The photoconductor for electrophotography as claimed in claim 1, wherein said photoconductive layer further includes at least one of at least one hydrazone compound represented by general formula (III) or a pyrazoline compound represented by general formula (IV):



(III)



(IV)

wherein each of R1, R2, R3 and R4 is selected from the group consisting of an alkyl group, an alkenyl group, an aryl group and an aromatic heterocyclic group, each of which groups may be substituted, and each of R5, R6 and R7 is selected from the group consisting of an alkenyl group, an aryl group and an aromatic heterocyclic group, each of which groups may be substituted.

5. The photoconductor as claimed in claim 2, wherein said photoconductive layer comprises a layer including a charge generating substance selected from said at least one disazo compound represented by the general formula (I), a charge transporting substance selected from said at least one of at least one hydrazone compound represented by general formula (III) or a pyrazoline compound represented by general formula (IV), and a binder resin, the charge generating substance and the charge transporting substance being dispersed within the binder resin.

6. The photoconductor as claimed in claim 2, wherein said photoconductive layer comprises a laminate of a charge transporting layer mainly composed of a charge transporting substance and a charge generating layer including a compound selected from said at least one disazo compound represented by general formula (I) and a compound selected from said at least one of a least one hydrazone compound represented by general formula (III) or a pyrazoline compound represented by general formula (IV).

4,988,595

CHARGE TRANSPORT LAYER CONTAINING DIFFERENT AROMATIC DIAMINE ACTIVE CHARGE TRANSPORT COMPOUNDS

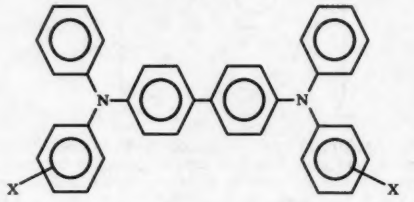
Damodar M. Pai, Fairport; John F. Yanus, Webster, and Paul J. DeFeo, New York, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 18, 1989, Ser. No. 451,832

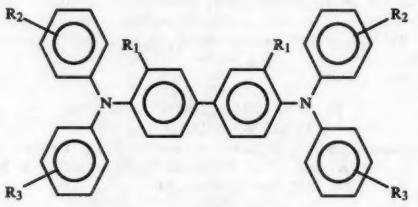
Int. Cl.[5] G03G *5/04*

U.S. Cl. 430—59 **14 Claims**

1. An electrophotographic imaging member comprising a charge generating layer and a charge transport layer, said charge transport layer comprising a film forming binder, a first aromatic diamine represented by the general formula:



wherein X is selected from the group consisting of an alkyl group containing from 1 to 4 carbon atoms and chlorine and a second aromatic diamine represented by the general formula:



wherein R_1 represents an alkyl group or an alkoxy group, R_2 represents a hydrogen atom, an alkyl group an alkoxy group, a halogen atom, an alkoxycarbonyl group or a substituted amino group and R_3 represents an alkyl group an alkoxy group, a halogen atom, an alkoxycarbonyl group or a substituted amino group.

4,988,596

PHOTOSENSITIVE MEMBER CONTAINING HYDRAZONE COMPOUND WITH STYRYL STRUCTURE

Hideaki Ueda, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

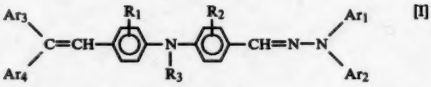
Filed Feb. 9, 1990, Ser. No. 477,461

Claims priority, application Japan, Feb. 10, 1989, 1-31835; Feb. 10, 1989, 1-31837; Feb. 10, 1989, 1-31838

Int. Cl.[5] G03G *5/05, 5/14*

U.S. Cl. 430—59 **29 Claims**

1. A photosensitive layer formed on or over the substrate and including a charge generating material and a hydrazone compound represented by the general formula (I);



[I]

wherein R_1 and R_2 are independently a hydrogen atom, an

alkyl group, an alkoxy group or a halogen atom; R_3 is a hydrogen atom, an alkyl group, an aralkyl group, an aryl group, a condensed polycyclic ring group or a heterocyclic ring group (these groups may have one or more substituent(s)); R_3 may form a condensed ring together with a benzene ring in the formula (I); Ar_1 and Ar_2 are independently an alkyl group, an aryl group, a condensed polycyclic ring group or a heterocyclic ring group (these groups may have one or more substituent(s); Ar_3 and Ar_4 are independently a hydrogen atom, an alkyl group, an aryl group, a condensed polycyclic ring group or a heterocyclic ring group (these groups may have one or more substituent(s); Ar_3 and Ar_4 are not hydrogen atoms at the same time; Ar_1 and Ar_2, and/or Ar_3 and Ar_4 may form a ring in combination.

4,988,597

CONDUCTIVE AND BLOCKING LAYERS FOR ELECTROPHOTOGRAPHIC IMAGING MEMBERS

John W. Spiewak, Webster; Huoy-Jen Yuh, Pittsford; Constance J. Thornton, Ontario; Dennis A. Abramsohn, Pittsford; Deborah Nichol-Landry, Rochester, and Joseph Mammino, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1989, Ser. No. 458,875
Int. Cl.[5] G03G *5/10*
U.S. Cl. 430—62 20 Claims

1. An electrophotographic imaging member comprising a supporting substrate, an electrically conductive layer comprising at least a partially cross-linked polymer having a backbone derived from alkyl acrylamidoglycolate alkyl ether, a charge blocking layer comprising a polymer having a backbone derived from alkyl acrylamidoglycolate alkyl ether and at least one photoconductive layer.

4,988,598

TONER FOR USE IN DEVELOPING ELECTROSTATIC IMAGES

Makoto Tomono, Hino; Noriyoshi Tarumi, Tama, and Masayuki Sato, Ohtsuki, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 147,025, Jan. 19, 1988, abandoned, which is a continuation of Ser. No. 65,092, Jun. 18, 1987, abandoned, which is a continuation of Ser. No. 768,496, Aug. 22, 1985, abandoned, which is a division of Ser. No. 550,992, Nov. 14, 1983, abandoned, which is a continuation of Ser. No. 279,673, Jul. 1, 1981, abandoned, which is a continuation of Ser. No. 50,475, Jun. 20, 1979, abandoned, which is a continuation of Ser. No. 741,408, Nov. 12, 1976, abandoned, Continuation-in-part of Ser. No. 408,008, Oct. 19, 1973, abandoned. This application Feb. 6, 1990, Ser. No. 477,193
Claims priority, application Japan, Oct. 21, 1972, 47-104865; Oct. 23, 1972, 47-105289
The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.
Int. Cl.[5] G03G *13/20*
U.S. Cl. 430—99 15 Claims

1. In a method of electrophotography comprising developing an electrostatic latent image with a toner composition, then fixing the toner image by passing a paper bearing said toner image between rollers, at least one of which is heated to a temperature of about 155° to about 210° C., the improvement wherein the toner composition comprises

(a) a styrene homopolymer or copolymer of styrene with at least one acrylic comonomer, and

(b) an effective amount of polypropylene having a number average molecular weight of about 2,000 to about 6,000.

4,988,599

ELECTROPHOTOGRAPHIC COLOR TONER HAVING SELECTED INDEX OF REFRACTION RANGE

Masahiko Kubo, Nara, Japan, assignor to MITA Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 150,457, Jan. 28, 1988, abandoned, which is a continuation of Ser. No. 909,998, Sep. 22, 1986, abandoned. This application Jan. 4, 1989, Ser. No. 293,584
Claims priority, application Japan, Sep. 30, 1985, 60-218518
Int. Cl.[5] G03G *9/08, 13/01*
U.S. Cl. 430—109 7 Claims

1. A color toner for forming a developed image on a polyethylene terephthalate (PETP) transparent sheet, comprising: a coloring agent means, and a polyacrylate or polymethacrylate binding resin means, said binding resin means having a softening point between about 120° C. and 140° C., and said color toner having a refractive index smaller than about 1.50 and greater than about 1.00.

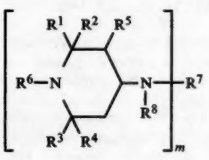
4,988,600

PARTICULATE ELECTROPHOTOGRAPHIC TONER MATERIAL

Piet Kok, Mariakerke-Gent; Luc J. Vanmaele, Lochristi, and Serge M. Tavernier, Lint, all of Belgium, assignors to Agfa-Gevaert, N.V., Mortsel, Belgium

Filed Mar. 13, 1990, Ser. No. 492,832
Claims priority, application European Pat. Off., Mar. 24, 1989, 89200766.7
Int. Cl.[5] G03G *9/08*
U.S. Cl. 430—110 10 Claims

1. Particulate toner material for use in the development of latent electrostatic images, wherein said particulate toner material is capable of acquiring by triboelelectric contact electrification a net positive charge and contains thermoplastic resin(s) as binder in combination with a colorant and a colourless compound capable of imparting a positive charge to the particulate toner material in contact electrification, characterized in that said colourless compound corresponds to the following general Formula (A) or is a polymer consisting essentially of repeating units according to general formula (B) or is an amine-salt or quaternary ammonium derivative thereof:



(A)

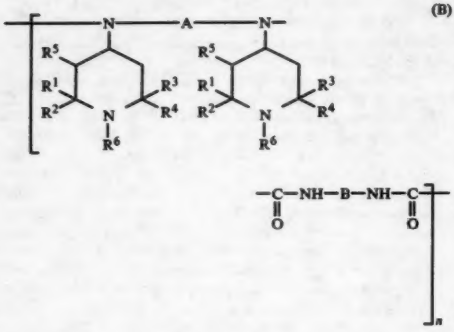
wherein:

each of R^1, R^2, R^3 and R^4 independently of each other, stands for a 1–6C alkyl group, R^5 represents hydrogen or a 1–5C alkyl group, R^6 represents hydrogen, a 1–12C alkyl group, a 3–12 C alkenyl group, or a 7–12C aralkyl group, m is 1 to 4, and

R^7 represents where m is 1 an acyl group, a N-substituted carbamoyl group or a N-substituted thiocarbamoyl group, where m is 2 a carbonyl thiocarbonyl or a diacyl group, a N-substituted dicarbamoyl group or a N-substituted dithiocarbamoyl group, where m is 3 a triacyl group, a N-substituted tricarbamoyl group or a N-substituted trithiocarbamoyl group, and where m is 4 a tetraacyl group, a N-substituted tetracarbamoyl group or a N-substituted tetrathiocarbamoyl group, the N-substituents of said carbamoyl and thiocarbamoyl groups being a hydrocarbon group or a heterocyclic group, and

R^8 represents hydrogen an alkyl group or an aralkyl group, or R^7 and

Rhu 8 together represent the necessary atoms to close a saturated heterocyclic nitrogen containing ring;



(B)

wherein:

each of R^1, R^2, R^3 and R^4, independently of each other, stands for a 1–6C alkyl group, R^5 represents hydrogen or a 1–5C alkyl group,

R^6 represents hydrogen, a 1–12 C alkyl group, a 3–12C alkenyl group, or a 7–12C aralkyl group,

each of A and B, independently of each other, represents a 2–12C alkylene group, 7–18 aralkylene group, a 5–12 cycloalkylene group or an arylene group, and

n is 2 to 200.

4,988,601

PHOTOSENSITIVE RESIN COMPOSITION WITH O-QUINONE DIAZIDE AND NOVOLAC RESINS PREPARED FROM MIXED PHENOLIC REACTANTS TO INCLUDE 3,5-XYLENOL AND 2,5-XYLENOL

Toru Ushirogouchi, Yokohama; Shuji Hayase, Kawasaki; Yasunobu Onishi, and Rumiko Horiguchi, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 25, 1988, Ser. No. 275,967

Claims priority, application Japan, Nov. 26, 1987, 62-297971; Mar. 26, 1988, 63-72734

Int. Cl.[5] G03F *7/023*; G03C *1/60*

U.S. Cl. 430—192 **5 Claims**

1. A photosensitive resin composition comprising: an admixture of a novolak resin (a) prepared by condensing 2,5-xylenol, m-cresol and/or p-cresol with a carbonyl compound;

a novolak resin (b) prepared by condensing 3,5-xylenol, m-cresol and/or p-cresol with a carbonyl compound; and an o-quinonediazide photosensitive reagent in a photosensitizing amount, wherein the amount of resin (a) is 30 to 70 wt % and the amount of resin (b) is 70 to 30 wt % as based on the total amount of resin present in the composition.

4,988,602

LIQUID ELECTROPHOTOGRAPHIC TONER WITH ACID CONTAINING POLYESTER RESINS

Susan K. Jongewaard; Mohamed A. Elmasry, and Kevin M. Kidnie, all of St. Pau., Minn., assignors to Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Filed Apr. 18, 1990, Ser. No. 510,721

Int. Cl.[5] G03G *9/00*

U.S. Cl. 430—115 **30 Claims**

1. A liquid toner for developing an electrostatic image comprising chelating copolymer particles dispersed in a non-polar carrier liquid, said chelating copolymer particles comprising a thermoplastic resinous core having a Tg of 25° C. or less and is insoluble or substantially insoluble in said carrier liquid, and chemically anchored to said core a copolymeric steric stabilizer soluble in said carrier liquid and having covalently attached thereto moieties of a coordinating compound and at least one metal soap compound derived from metals which form strong coordinate bonds with said moieties, said stabilizer being chosen from the classes of block and graft copolymers, and a thermoplastic ester resin present in an amount equal to 5–95% by weight of said metal soap compound, said resin is an acid containing resin and has an acid number of between 1 and 200.

4,988,603

METHOD FOR THE FORMATION OF HIGH-CONTRAST IMAGES USING A DEVELOPER COMPRISING A HYDRAZINE DERIVATIVE

Yasuhiko Takamuki; Takeshi Habu, and Junichi Fukawa, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,438

Claims priority, application Japan, Jan. 11, 1988, 63-3576; Jan. 11, 1988, 63-3579

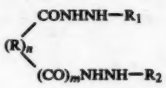
Int. Cl.[5] G03C *5/00, 5/24*

U.S. Cl. 430—264 **25 Claims**

1. A method for forming an image comprising the step of developing a silver halide photographic light-sensitive material having a silver halide emulsion layer with a developer,

wherein said silver halide emulsion layer contains a compound selected from the group consisting of 3-pyrazolidone type compounds, dihydroxybenzene type compounds and trihydroxybenzene type compounds;

said developer contains a compound selected from the group consisting of dihydroxybenzene type compounds and trihydroxybenzene type compounds; (ii) a sulfite, and (iii) an amino compound; and said development is performed in the presence of a compound represented by the following Formula 1;



Formula 1

wherein R_1 and R_2 each represents an aryl group or a heterocyclic group, R is a divalent organic group, n is an integer of zero to 6 and m is an integer of zero or 1, provided that when n is 2 to 6 the Rs are the same as or different from each other.

4,988,604

HIGH CONTRAST PHOTOGRAPHIC ELEMENT INCLUDING AN ARYL SULFONAMIDOPHENYL HYDRAZIDE CONTAINING BOTH THIO AND ETHYLENEOXY GROUPS

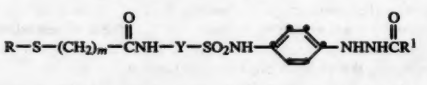
Harold I. Machonkin, Webster, and Donald L. Kerr, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 24, 1990, Ser. No. 528,650

Int. Cl.[5] G03C *1/10*

U.S. Cl. 430—264 **8 Claims**

1. A silver halide photographic element adapted to form a high contrast image upon development with an aqueous alkaline developing solution, said element including at least one layer comprising, as a nucleating agent, an aryl sulfonamidophenyl hydrazide of the formula:



where R is a monovalent group comprised of at least three repeating ethyleneoxy units, m is 1 to 6, Y is a divalent aromatic radical, and R^1 is hydrogen or a blocking group.

4,988,605

LIGHT-SENSITIVE RESIN COMPOSITION AND LIGHT-SENSITIVE ELEMENT

Shigeru Kubota; Katsue Masui; Toshimoto Moriwaki, and Torahiko Andou, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP88/00669, § 371 Date Mar. 2, 1989, § 102(e) Date Mar. 2, 1989, PCT Pub. No. WO89/00586, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 5, 1988, Ser. No. 329,893

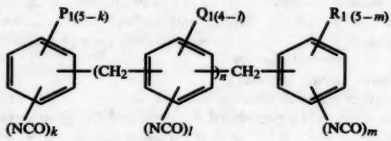
Claims priority, application Japan, Jul. 9, 1987, 62-171476

Int. Cl.[5] G03C *1/492*

U.S. Cl. 430—270 6 Claims

1. A light-sensitive resin composition which contains:

(a) a multivalent aromatic polyurethane poly (meth)acrylate having at least two (meth)acryloyl groups and at least two urethane bonds in one molecule and which is obtained by reacting a (meth)acrylate monoester of a dihydric alcohol with a polyvalent aromatic isocyanate represented by the general formula:



(I)

(where k is 1 or 2, l is 1 or 2, m is 1 or 2, $P_{1(5-k)}$ is a hydrogen atom or a methyl group $Q_{1(4-l)}$ is a hydrogen atom or a methyl group, $R_{1(5-m)}$ is a hydrogen atom or a methyl group, and n is an integer of 0–20);

(b) a linear high-molecular weight compound; and

(c) a polymerization initiator which generates free radicals upon exposure to light.

4,988,606

NEGATIVE-WORKING RADIATION-SENSITIVE MIXTURE WITH POLYMER HAVING 1,2,3-THIADIAZOLE GROUPS, AND RECORDING MATERIAL PRODUCED THEREFROM

Werner Prass; Rudolf Zertani; Juergen Lingnau, and Norbert Hanold, all of Mainz, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

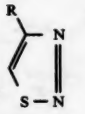
Filed Oct. 12, 1989, Ser. No. 420,527

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835039; Dec. 5, 1988, 3840910

Int. Cl.[5] G03F *7/038*

U.S. Cl. 430—270 8 Claims

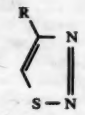
1. A negative-working radiation-sensitive mixture comprising a binder and a polymer containing 1, 2, 3-thiadiazole groups, wherein the binder is a polyfunctional compound having functional groups that react with ketene and the polymer comprises a compound obtained by polymerization of a compound of the general formula I



(I)

in which R is a polymerizable group.

6. A negative-working radiation-sensitive mixture comprising a polymer containing 1, 2, 3-thiadiazole groups, wherein the polymer is obtained by polymerization of a compound of the general formula I



(I)

in which R is a polymerizable group, with a comonomer, and contains functional groups capable of reacting with ketenes.

4,988,607

HIGH SPEED PHOTOPOLYMERIZABLE ELEMENT WITH INITIATOR IN A TOPCOAT

Mohammad Z. Ali, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 30, 1989, Ser. No. 357,908

Int. Cl.[5] G03C *1/492*

U.S. Cl. 430—271 37 Claims

1. A method for formation of fine pattern of a conjugated with at least two layers over a surface of said substrate, wherein a lower layer of said two layers comprises a free radically polymerizable compound containing at least one ethylenically unsaturated double bond, and an oxygen top oxygen barrier layer of said two layers comprises a barrier polymeric binder and a first photoinitiator for free radical polymerization.

4,988,608

METHOD FOR FORMING FINE PATTERN OF CONJUGATED POLYMER FILM

Toshihiko Tanaka, and Shuji Doi, both of Tsukuba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

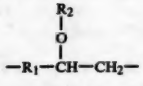
Filed Nov. 3, 1989, Ser. No. 431,178

Claims priority, application Japan, Nov. 7, 1988, 63-281785

Int. Cl.[5] G03C *5/16;* G03F *7/038, 7/32*

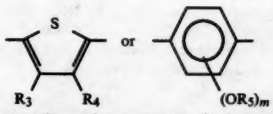
U.S. Cl. 430—325 8 Claims

1. A method for fomation of fine pattern of a conjugated polymer film which comprises irradiating a coat containing a precursor for conjugated polymers which has a recurring unit represented by the formula (1):



(I)

wherein R_1 represents



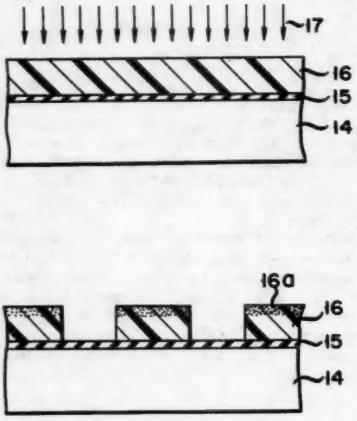
in which R_3 and R_4 each represents a hydrogen atom or an alkyl or alkoxy group of 1–5 carbon atoms, R_5 represents a hydrocarbon group of 1–5 carbon atoms and m is 1 or 2; and R_2 represents a hydrogen atom or a hydrocarbon group of 1–10 carbon atoms with a light of 200–500 nm in wavelength in pattern form and then dissolving and removing the precursor of unirradiated portion.

4,988,609

METHOD OF FORMING MICRO PATTERNS

Hidetsuna Hashimoto, Yokohama; Tiharu Kato, Kitakami, and Hitoshi Tsuji, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 13, 1988, Ser. No. 205,938
Claims priority, application Japan, Jun. 18, 1987, 62-152165
Int. Cl.[5] G03C 5/00
U.S. Cl. 430—326 6 Claims



1. A method of forming micro patterns comprising the steps of:

forming a resist layer on a layer to be processed;

exposing said entire resist layer to rays of light;

thereafter thermally heating said resist layer, to form a layer on a surface region of said resist layer, with said formed layer being solution-retarded by a developer;

immediately following the thermally heating step, exposing only selected portions of said resist layer to rays of light, thereby forming a predetermined pattern thereon; and

developing said resist layer.

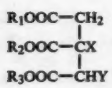
4,988,610

HYDROPHILIC COLLOID COMPOSITIONS FOR PHOTOGRAPHIC MATERIALS

Alan R. Pitt, Hertfordshire; John T. Wear; Rachel Richardson, both of Middlesex, and David Young, Hertfordshire, all of England, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1989, Ser. No. 358,211
Claims priority, application United Kingdom, Jul. 26, 1988, 8817811
Int. Cl.[5] G03C 5/24
U.S. Cl. 430—449 11 Claims

1. A composition comprising hydrophobic dye-forming coupler dispersed in hydrophilic gelatin colloid with the aid of a surface active agent characterised in that the surface active agent is a compound having the formula



wherein

each of R_1, R_2 and R_3 independently is a substituted or unsubstituted alkyl group or a substituted or unsubstituted aryl group;

each of X and Y is —H or $—Q^-M^+$;

Q^- is an anion; and,

M^+ is a cation;

provided that when X is —H, Y is $—Q^-M^+$ and that when X is $—Q^-M^+$, Y is —H.

4,988,611

IMAGING UTILIZING A LIGHT-HANDLEABLE PHOTOGRAPHIC ELEMENT HAVING SOLID PARTICLE DISPERSION FILTER DYE LAYER

Richard B. Anderson, Fairport; Ronda E. Factor, Rochester; Anthony Adin, Rochester, and Donald R. Diehl, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 213,652, Jun. 30, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,850
Int. Cl.[5] G03C 1/00
U.S. Cl. 430—494 14 Claims

1. A method of forming an image in a photographic element comprising handling the element under a first radiation source and imagewise exposing the element to a second radiation source, said element comprising

a support having thereon

a radiation-sensitive silver halide emulsion layer that is sensitive to at least a portion of the region of the spectrum of radiation emitted by the first radiation source and a portion of the region of the spectrum of radiation emitted by the second radiation source, and

a layer, positioned in said element so as to be between the first radiation source and the radiation-sensitive layer during said handling step, comprising a hydrophilic binder and at least one filter dye that absorbs in the wavelength region emitted by the first source and to which the radiation-sensitive layer is sensitive,

wherein said filter dye is a solid particle dispersion, having a mean diameter of from about 0.01 to 10 μm, in an amount sufficient to prevent formation in the radiation-sensitive layer of a developable latent image from exposure to the first radiation source, of a dye having the formula:

$$[D—(A)_y]—X_n \quad (I)$$

where D is a chromophoric radiation-absorbing moiety, said moiety comprising an aromatic ring when y is 0,

A is an aromatic ring bonded directly or indirectly to D,

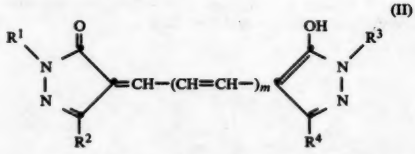
X is a substituent, either on A or on an aromatic ring portion of D, with an ionizable proton having a pKa of 4 to 11 in a 50/50 mixture on a volume basis of ethanol and water,

y is 0 to 4, and

n is 1 to 7,

said dye, when in nonionized form, having a log partition coefficient of from 0 to 6,

except for dyes of the formula:



(II)

where R^1 and R^3 each independently represents an alkyl group or an aryl group, R^2 and R^4 each independently represents an alkyl group, an aryl group, or COOR where R is alkyl or aryl, m is 0 or a positive integer, and the molecule contains at least two carboxyl groups in their free acid form and further contains no solubilizing groups.

4,988,612

RESISTIVELY HEATABLE PHOTOTHERMOGRAPHIC ELEMENT

Gary E. LaBelle, Hugo, Minn., and David T. Ask, Somerset, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 936,248, Dec. 1, 1986, abandoned. This application Apr. 8, 1988, Ser. No. 183,257
Int. Cl.[5] G03C 1/76
U.S. Cl. 430—531 14 Claims

1. A photothermographic element comprising a support base having on one surface thereof at least one photothermographically imageable layer and adhered to the opposite surface of said support a resistive layer having a resistance of between 60 and 2000 ohms per square and a resistance ratio of more than 1.05 and less than 3.00, wherein said resistive layer consists essentially of a blend of at least two polymers and a conductive filler, one of the polymers in said blend has a resistance ratio less than 1.50 and the other of said polymers has a resistance ratio of greater than 3.00, and wherein said polymer having a resistance ratio of less than 1.50 is selected from the group consisting of polyacrylate, poly(vinylidene chloride), poly(vinyl chloride), poly(vinyl butyral), poly(vinyl formal), poly(vinyl acetate), cellulose acetate, ethyl cellulose, polyurethane, cellulose acetate esters, and copolymers thereof and wherein said resistive layer has a thickness of 0.75×10^{-5}m and contains 30 to 60% by weight of said conductive filler.

4,988,613

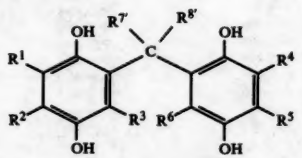
SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Nobutaka Ohki; Hideaki Naruse; Satoshi Nagaoka, and Kouichi Hanaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 24, 1989, Ser. No. 397,926
Claims priority, application Japan, Aug. 24, 1988, 63-209808; Aug. 31, 1988, 63-217290; Sep. 28, 1988, 63-240699
Int. Cl.[5] G03C 7/26, 7/32
U.S. Cl. 430—547 4 Claims

4. A silver halide color photographic material comprising a support having thereon at least one light-sensitive silver halide emulsion layer comprising a color coupler, at least one layer of said material being an internal latent image type silver halide emulsion layer which has not been previously fogged, and at least one layer of said material comprising a compound represented by formula (II-A):

(II-A)



wherein R^1, R^2, R^3, R^4, R^5 and R^6, which may be the same or different, each represents hydrogen, a halogen atom, a sulfo group, a carboxyl group, a cyano group, an alkyl group, an aryl group, an acylamino group, a sulfonamido group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an acyl group, an acyloxy group, a sulfonyl group, a carbamoyl group, an alkoxycarbonyl group or a sulfamoyl group; provided that R^1 and R^2, or R^4 and R5 may each be linked to form a carbon ring or a heterocyclic ring; $R^{7'}$ and $R^{8'}$ each represents a hydrogen, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic group, and $R^{7'}$ and $R^{8'}$ may be linked to form a carbon ring or a heterocyclic group.

4,988,614

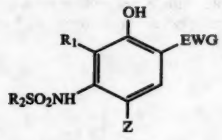
SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING NOVEL MAGENTA COUPLERS

Osamu Ishige; Hidetaka Ninomiya; Toyoaki Masukawa, and Junichi Kohno, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Sep. 20, 1989, Ser. No. 409,928
Claims priority, application Japan, Sep. 27, 1988, 63-239667
Int. Cl.[5] G03C 7/34
U.S. Cl. 430—552 6 Claims

1. A silver halide photographic light-sensitive material comprising a magenta coupler represented by the following Formula I:

(I)



wherein R_1 is a hydrogen atom or a substituent; R_2 is a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted heterocyclic group or a substituted or unsubstituted amino group; provided, R_1 and R_2 are allowed to bond together so as to complete a ring; Z is a hydrogen atom or a group capable of being split off upon coupling reaction with the oxidized product of a an aromatic primary amine developing agent; and EWG is an electron attractive group having a Hammet's σp value of more than 0.3.

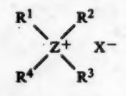
4,988,615

STABILIZERS FOR PHOTOGRAPHIC EMULSIONS

Paul Davies, White Bear lake; Nelson B. O'Bryan, Jr., St. Paul, and James B. Philip, Jr., Mahtomedi, all of Minn., assignors to Minnesota Mining and Mnaufacturing Company, St. Paul, Minn.

Filed Feb. 10, 1988, Ser. No. 154,293
Int. Cl.[5] G03C 1/02
U.S. Cl. 430—576 37 Claims

1. A silver halide photographic emulsion containing at least one spectral sensitizing dye which provides sensitivity to said emulsion in the infrared region of the electromagnetic spectrum, said emulsion or top coat being characterized by containing a salt of the formula:



where R^1, R^2, R^3, and R^4 are independently selected from the group consisting of alkyl, aryl, aralkyl and alkaryl, or where two adjacent groups of R^1, R^2, R^3 and R^4 may form a 5-, 6-, or 7- membered heterocyclic ring with the included Z atom, and wherein the total number of carbon atoms in R^1, R^2, R^3, and R^4 is at least 18, with two of said R^1, R^2, R^3, and R^4 having at least 5 carbon atoms, Z is P or N, and X^- is an acid anion.

4,988,616

METHOD FOR DETECTING HYDROGEN PEROXIDE EMPLOYING TRIARYL- AND TRIHETARYLMETHANE DERIVATIVES AS REDOX INDICATORS

Holger Heidenreich, Cologne; Gerhard Wolfrum, Leverkusen; Klaus Wehling, Wuppertal, and Herbert Hugl, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

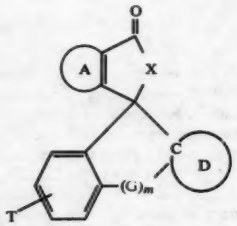
Continuation of Ser. No. 53,301, May 22, 1987, abandoned. This application Jan. 24, 1989, Ser. No. 302,072

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1986, 3619436

Int. Cl.[5] C12Q *1/00*; G01N *21/78*

U.S. Cl. 435—4 7 Claims

1. A method for detecting hydrogen peroxide comprising contacting a sample with a peroxidase or a peroxidatively-active substance and a reflux indicator of the formula



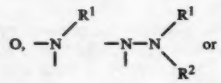
in which

A and D, independently of one another represent unsubstituted phenyl, pyridyl or imidazolyl or phenyl, pyridyl, or imidazolyl substituted by halogen, hydroxyl, alkoxy, aryloxy, aralkoxy, aryl, cycloalkyl, hetaryl, alkylmercapto, arylmercapto, alkylsulphonyl, cyano, alkylcarbonyl, alkylcarbonyloxy, nitro, acylamino, alkylsulphonic acid, arylsulphonic acid, alkylcarboxylic acid, aralkylcarboxylic acid, amino which is unsubstituted or substituted by 1 or 2 alkyl, aryl or aralkyl groups, which themselves are unsubstituted or substituted by halogen, cyano, hydroxyl, sulphonic acid, carboxylic acid or substituted amino, or amino groups, the substituents of which are cyclized,

G represents O, CH_2 or S,

m represents the number zero or one,

X represents



—NR^1—NR^2—,

R^1 and R^2 denote hydrogen and

T denotes hydrogen, hydroxyl, alkyl, aryl, alkoxy, phenoxy, SO_3H, —COOH or

whereby a color change is brought about if hydrogen peroxide is present and detecting any color change in the sample.

4,988,617

METHOD OF DETECTING A NUCLEOTIDE CHANGE IN NUCLEIC ACIDS

Ulf Landegren, and Leroy Hood, both of Pasadena, Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Mar. 25, 1988, Ser. No. 173,280

Int. Cl.[5] C12Q *1/68, 1/00*; C07H *15/12*; C12N *15/00*

U.S. Cl. 435—6 28 Claims

1. An assay for a biologically derived denatured DNA or RNA test substance, which has a known normal nucleotide sequence and a known possible mutation at at least one target nucleotide position in said sequence, which assay determines whether the test substance has said normal nucleotide sequence or said possible mutation, said assay comprising the steps of

(a) annealing a target oligonucleotide probe of predetermined sequence to a first sequence of said test substance so that said target nucleotide position is aligned with a nucleotide in an end region of said target probe,

(b) annealing an adjacent oligonucleotide probe of predetermined sequence to a second sequence of said test substance contiguous to said first sequence, so that the terminal nucleotide in said end region of said target probe and one end of said adjacent probe are directly adjacent to each other,

(c) contacting said annealed target probe and adjacent probe with a linking agent under conditions such that the directly adjacent ends of said probes covalently bond to form a linked probe product unless there is nucleotide base pair mismatching between said target probe and said test substance at the target nucleotide position,

(d) separating said test substance and linked probe product, if formed, and

(e) detecting whether or not said linked probe product is formed as an indication of nucleotide base pair matching or mismatching at said target nucleotide position.

4,988,618

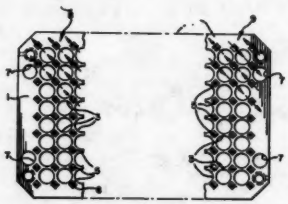
MAGNETIC SEPARATION DEVICE AND METHODS FOR USE IN HETEROGENEOUS ASSAYS

May K. Li, Framingham; Jack Kessler, Ashland, and David T. Bach, Westborough, all of Mass., assignors to GENE-TRAK Systems, Framingham, Mass.

Continuation of Ser. No. 121,191, Nov. 16, 1987, abandoned. This application May 3, 1989, Ser. No. 347,544

Int. Cl.[5] G01N *33/553*

U.S. Cl. 435—6 17 Claims



1. A magnetic separation apparatus for use in assays employing solid phases comprising magnetic particles, said apparatus comprising:

(a) base means having a plurality of orifices for receiving nonferrous containers adapted to contain said magnetic particles; and

(b) a plurality of magnet means mounted on said base and spaced about the periphery of each receiving orifice wherein each of said magnet means possess a north-south magnetic field orientation in a direction which is coplanar with a cross-sectional plane through said receiving orifices and wherein each of said north-south magnetic fields of said magnet means are oriented in a common direction and wherein said magnet means are mounted in a fixed relation with respect to themselves and to said base

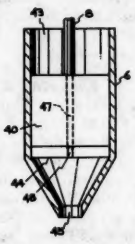
whereby each nonferrous container, when placed in receiving relationship with each of said orifices, has four magnet means about its periphery.

4,988,619

FLOW CYTOMETRY APPARATUS

Daniel Pinkel, Walnut Creek, Calif., assignor to United States Department of Energy, Washington, D.C.

Filed Nov. 30, 1987, Ser. No. 126,153
Int. Cl.[5] C12Q *1/24*
U.S. Cl. 435—30 14 Claims



1. An apparatus for orienting cells in a sheath fluid in a cytometer/sorter, comprising:

a flow chamber;

means for flowing the sheath fluid through the flow chamber along a direction of flow;

means for obstructing the flow of the sheath fluid in the flow chamber with a first dimension, which extends substantially across the flow chamber and is substantially perpendicular to the direction of flow and with a thickness perpendicular to the first dimension of the obstructing means wherein the sheath fluid flows around the thickness so that the sheath fluid converges in only one dimension at the downstream edge of the means for obstructing; and

means for introducing the cells through the means for obstructing the flow to the region where the sheath fluid converges in only one dimension in the sheath fluid to orient the cells, with an aperture wherein as the cells pass from the means for introducing the cells to the region where the sheath fluid converges the cells pass through the aperture with a cross-sectional length substantially less than or equal to the thickness of the means for obstructing the flow.

4,988,620

METHOD FOR PRODUCING THE FNUDI RESTRICTION ENDONUCLEASE AND METHYLASE

Elizabeth M. Van Cott, Salem, and Geoffrey G. Wilson, Boxford, both of Mass., assignors to New England Biolabs, Inc., Beverly, Mass.

Filed Dec. 17, 1987, Ser. No. 134,234
Int. Cl.[5] C12N *9/22, 1/21, 15/52*
U.S. Cl. 435—199 8 Claims

1. Isolated DNA coding for the FnuDI restriction endonuclease, wherein the isolated DNA is obtainable from the vector pFnuDIRM 102-1.

4,988,621

PEPTIDES IN CELL DETACHMENT AND AGGREGATION

Erkki I. Ruoslahti, Rancho Santa Fe; Edward G. Hayman, Oceanside, and Michael D. Pierschbacher, San Diego, all of Calif., assignors to La Jolla Cancer Research Foundation, La Jolla, Calif.

Continuation of Ser. No. 738,078, May 24, 1985, Pat. No. 4,879,237. This application Dec. 10, 1987, Ser. No. 131,130
Int. Cl.[5] C12N *5/06, 5/02*
U.S. Cl. 435—240.2 6 Claims

1. A method of promoting animal cell aggregation comprising contacting the animal cells with a solution containing a polypeptide consisting essentially of the amino acid sequence Arg-Gly-Asp.

4,988,622

RECOMBINANT PLASMID DNA PVN 22 CODING BIOSYNTHESIS OF HUMAN LEUKOCYTE INTERFERON ALPHA-I1 AND STRAIN PSEUDOMONAS SP. 31 (PVN 22) - PRODUCER OF HUMAN LEUKOCYTE INTERFERON ALPHA-I1 CONTAINING SAME

Jury I. Kozlov, ulitsa Golubinskaya, 7, korpus 2, kv. 178; Vera A. Nardoditskaya, ulitsa Generala Belova, 45, korpus 3, kv. 357, both of Moscow; Marina R. Eremashvili, prospekt Pshavela, II kvartal, korpus 23, kv. 24, Tbilisi; Alexander Y. Strongin, Sumskoi proezd, 2, korpus 4, kv. 21, Moscow; Viktor E. Sterkin, Sumskoi proezd. 2, korpus 1, kv. 496, Moscow; Marina A. Skvortsova, Starokonjushenny pereulok, 19, kv. 9, Moscow; Andrei J. Chistoserdov, poselok Mendeleeva, ulitsa Institytskaya, 9, kv. 49, Moskovskaye oblast; Jury D. Tsygankov, ulitsa Generale Tjuleneva, 35, kv. 114, Moscow; Ljudmila V. Evdonina, Kolomensky proezd, 14, korpus 2, kv. 421, Moscow; Vitaly L. Jurin, Leningradsky prospekt, 78, korpus 4, kv. 21, Moscow; Galina S. Monastyrskaya, ulitsa Chertanovskaya, 29, korpus 1, kv. 126, Moscow; Evgeny D. Sverdlov, ulitsa Matveevskaya, 10, korpus 4, kv. 357, Moscow; Grigory M. Dolganov, ulitsa Miklukho-Maklaya, 51, korpus 1, kv. 248, Moscow, and Sergei A. Tsarev, Novoyasenevsky prospekt, 19, korpus 4, kv. 326, Moscow, all of U.S.S.R.

PCT No. PCT/SU87/00052, § 371 Date Dec. 15, 1987, § 102(e) Date Dec. 15, 1987, PCT Pub. No. WO87/06613, PCT Pub. Date Nov. 5, 1987
PCT Filed Apr. 29, 1987, Ser. No. 163,967
Claims priority, application U.S.S.R., Apr. 30, 1986, 4065414
Int. Cl.[5] C12N *15/21, 1/21;* A61K *37/66*
U.S. Cl. 435—252.34 2 Claims

1. A recombinant plasmid DNA pVN22 coding the biosynthesis of a human leukocyte interferon α-I1, characterized in that it has the size of 10.85 t.p.b. and consists of the following units:

EcoRI—HindIII—a fragment of the plasmid pAYC37 with the size of 9.45 t.p.b.,

HindIII—EcoRI—a fragment of 1.4 t.p.b. size consisting of the following units:

a fragment of DNA of 0.25 t.p.b. size with the regulatory field of the gene D of the phague $\phi\times174$ and the first codons of the gene of interferon α,

gene of interferon α-I1 of 0.5 t.p.b. size,

a region of a human genome DNA of 0.65 t.p.b. size;

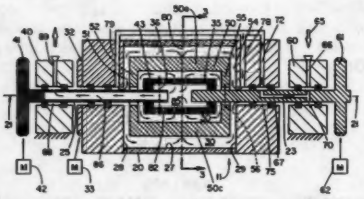
said recombinant plasmid DNA has the following genetic markers: genome Ap^R ensuring resistance against amplicillin, genome Sm^R ensuring resistance against streptomycin; contains the following unique regions of recognition of restrictases: HindIII-O; EcoRI—1.4 t.p.b., Bam HI - 10.82 t.p.b. deposited at the collection of cultures of microorganisms of the All-Union Research Institute of Antibiotics and registered under the entry No. 1788A.[1]

4,988,623

ROTATING BIO-REACTOR CELL CULTURE APPARATUS

Ray P. Schwarz, League City, and David A. Wolf, Houston, both of Tex., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 30, 1988, Ser. No. 213,559
Int. Cl.[5] C12M 3/00
U.S. Cl. 435—286 16 Claims



1. A bio-reactor system including

an outer first tubular member having closed ends for defining an enclosed cell culture vessel, said tubular member having a horizontally extending, longitude, central axis;

first means for rotating said first tubular member about said central axis;

a central second tubular member mounted within said first tubular member for rotation about said central axis, said second tubular member and said first tubular member defining an annular cell culture chamber;

second means for rotating said second tubular member about said central axis;

an intermediate blade means mounted in said annular cell culture chamber for rotation about said central axis;

third means for rotating said blade means about said central axis; where said first, second and third means for rotating are capable of providing independent rotation with respect to one another; and

first passage means for connecting an input fluid to said cell culture chamber and second passage means for connecting said cell culture chamber and said second tubular member for output of fluid from said cell culture chamber whereby fluid can be passed through said cell culture chamber while said tubular members and blade means are being rotated.

4,988,624

LYMPHOTOXIN DNA, LYMPHOTOXIN EXPRESSION VECTOR

Tetsu Kakutani; Kenji Yamashita, both of Kakogawa; yasuhiro Ikenaka, Akashi; Hajime Kawaharada, Kakogawa, and Kiyoshi Watanabe, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jul. 3, 1986, Ser. No. 882,109
Int. Cl.[5] C12N 15/00, 15/19, 15/63, 15/67
U.S. Cl. 435—320.1 7 Claims

1. A recombinant DNA sequence which codes for human lymphotoxin and contains the genomic DNA sequence for lymphotoxin, including introns.

2. A lymphotoxin expression vector comprising a DNA sequence containing the genomic DNA sequence, including introns, for human lymphotoxin operably linked to a promoter selected from the group consisting of an early promoter of SV40, a thymidine kinase promoter of herpes simplex virus and a late promoter of SV40.

4,988,625

METHOD FOR DETERMINING THE FUNCTIONALIZATION OF A SOLID SUPPORT

Stephen Marburg, Metuchen, and Richard L. Tolman, Warren, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Nov. 9, 1988, Ser. No. 269,221
Int. Cl.[5] G01N 31/00, 33/00, 30/02, 33/44
U.S. Cl. 436—5 3 Claims

1. A method for determining the level of functionalization of a solid support comprising

(a) treating the solid support with carbonyl diimidazole to form a support capable of reacting with a cleavable, bifunctional linking molecule;

(b) reacting the treated support with a cleavable, bifunctional linking molecule to form linker derivatized supports with stable carbamate bonds;

(c) reacting the linker derivatized supports with a polysaccharide; and

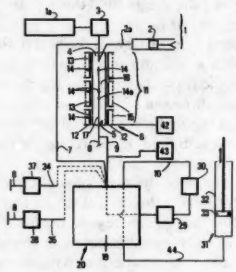
(d) determining the presence of pendant amino groups so as to provide an indication of the functionalization of a solid support.

4,988,626

ON-LINE TEST AND ANALYSIS PROCESS TO ESTABLISH A MATERIAL BALANCE OF A CHEMICAL REACTION

Hubert Ajot; Edouard Freund, both of Rueil Malmaison, and Pierre Grandvallet, Bruyeres, all of France, assignors to Institut Francais Du Petrole, Rueil-Malmaison, France

Filed Jun. 17, 1986, Ser. No. 875,167
Claims priority, application France, Jun. 17, 1985, 85 09136
Int. Cl.[5] G01N 7/00
U.S. Cl. 436—148 5 Claims



1. An on-line test and analysis process for establishing a material balance of a chemical reaction during a determined time period comprising:

(a) introducing a charge of known composition and flow rate into a reaction zone, said charge selected from the group consisting essentially of a gas, a liquid and mixtures thereof, wherein said charge is heated to a reaction temperature and is under a reaction pressure above atmospheric pressure;

(b) discharging a gas effluent from said reaction zone;

(c) withdrawing at least one aliquot sample of known volume of said effluent at said reaction temperature and pressure during a point in time of said time period;

(d) analyzing said aliquot sample of said effluent, said aliquot sample containing at least one constituent;

(e) expanding said effluent to atmospheric pressure to obtain an expanded effluent substantially at said point of time;

(f) withdrawing an aliquot sample of known volume of said expanded effluent substantially at said point in time;

(g) analyzing said aliquot sample of said expanded effluent, said aliquot sample containing said at least one constituent;

(h) measuring the total volume of said expanded effluent, and

(i) determining by processing means the material balance of

said chemical reaction from the composition and flow of said charge, the analysis of said aliquot sample of said effluent, the analysis of said aliquot sample of said expanded effluent and the volume of said expanded effluent.

4,988,627

TEST DEVICE WITH DRIED REAGENT DROPS ON INCLINED WALL

Margaret J. Smith-Lewis, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1987, Ser. No. 136,164
Int. Cl.[5] G01N *21/03, 33/545, 33/76*
U.S. Cl. 436—165 10 Claims

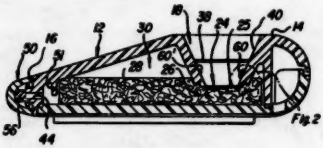


Fig 2

1. A method for manufacturing a test device for an immunoassay using a reagent selected from at least one immunoreagent and a buffer, comprising the steps of

(a) providing a chamber well having at least one wall sloped at an angle of at least about 60° to the horizontal when in use, and at the bottom of said well, a membrane that is porous to liquid and relatively non-porous to a complex comprising said immunoreagent and an analyte to which said immunoreagent is specific, said wall comprising a material that makes a static contact angle with aqueous drops containing said buffer or immunoreagent, that is not smaller than about 80°,

(b) depositing on said sloped wall above the membrane, at least one aqueous drop containing at least some of said buffer or said immunoreagent, in a volume that is no larger than about 6 μl so that said drop stays on the sloped wall and does not flow onto the membrane;

and (c) drying said drop on the sloped wall.

5. In an article of manufacture for conducting an immunoassay, said article comprising (a) a chamber well containing a reagent selected from at least one immunoreagent and a buffer, said well having at least one wall sloped at a predetermined angle of at least about 60° to the horizontal when in use, and (b) a membrane at the bottom of said well, said membrane being porous to liquid and relatively non-porous to a complex comprising said immunoreagent and an analyte to which said immunoreagent is specific;

the improvement wherein at least some of said buffer or immunoreagent is in at least one dried, water-redissolvable deposit located on said sloping wall above said membrane, present in an amount no greater than that which can be deposited in an aqueous drop no larger than about 6 μl,

and wherein said wall comprises a material that makes a static contact angle with aqueous drops containing said buffer or immunoreagent, that is not smaller than about 80°.

4,988,628

METHOD OF DRUG DETECTION

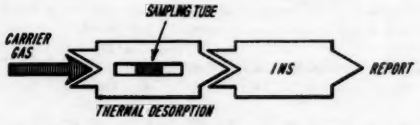
Amin A. Nanji, Wellesley, Mass., assignor to New England Deaconess Hospital Corporation, Boston, Mass.

Filed Feb. 28, 1989, Ser. No. 316,650
Int. Cl.[5] G01D *30/00, 33/94*
U.S. Cl. 436—173 8 Claims

1. A method of detecting a compound-of-interest in a body fluid comprising the steps of:

(a) obtaining a sample of a body fluid in liquid phase, said fluid sample including a plurality of native constituents and a compound-of-interest;

(b) separating said compound-of-interest from said native constituents in said body fluid sample; and



(c) analyzing said fluid sample with an ion mobility spectrometer to determine the presence of said compound-of-interest therein.

4,988,629

LACTOFERRIN-CONTAINING INCUBATION MEDIUM FOR SOLID-PHASE IMMUNOMETRIC METHODS AND ITS USE

Hans-Detlef Dopatka, and Rudolf Schmidtberger, both of Marburg, Fed. Rep. of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg/Lahn, Fed. Rep. of Germany

Filed Nov. 10, 1987, Ser. No. 118,982
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1986, 3638767; European Pat. Off., Apr. 15, 1987, 87105621
Int. Cl.[5] G01N *33/53*
U.S. Cl. 436—518 9 Claims

1. A method of detecting and determining an antibody or antigen in a biological fluid, comprising the steps of:

(a) heating said biological fluid;

(b) diluting said biological fluid with an incubation medium comprising lactoferrin, said lactoferrin being present in said medium substantially isolated from said other milk components and having a concentration in the range of 0.05 to 20 g/l;

(c) incubating said diluted sample with the conjugate antigen or antibody of said antibody or antigen;

(d) separating conjugate antibody or antigen bound to antibody or antigen from free conjugate antibody or antigen; and

(e) determining the amount of the bound conjugate antibody or antigen.

4,988,630

MULTIPLE BEAM LASER INSTRUMENT FOR MEASURING AGGLUTINATION REACTIONS

Fang-Chung Chen, Pine Brook, and Michael L. Franklin, Parsippany, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 27, 1987, Ser. No. 42,764
Int. Cl.[5] G01N *33/546*
U.S. Cl. 436—533 2 Claims

1. A method for measuring antigen-antibody reactions in a plurality of samples containing latex bonded antigen-antibody complexes by utilizing a multi-channel system having a laser for generating a beam of polarized, collimated light, and at least two beam splitters, the first beam splitter located int he path of the laser beam and positioned to divide the beam into a first primary beam which passes through the first beam splitter and a first reflective beam which reflects from the first beam splitter, the second beam splitter located in the path of the first primary beam passing through the first beam splitter and dividing this beam into a second primary beam passing through the second beam splitter and a second reflective beam reflecting from the second beam splitter, at least first and second samples being respectively located in the paths of the reflective beams, at least first and second detecting means each having a central detecting segment for detecting the transmission intensity of forward scattered light from the reflective beams which respectively pass through the at least first and second samples; reference detecting means located in the path

of the last primary beam or in the path of a reflective beam not having a sample passing therethrough for detecting the transmission intensity of a reference beam; processing means operatively communicating with the detecting means for converting the transmission intensities into digitized electrical signals; and a microprocessor means operatively communicating with the processing means for analyzing the signals from the processing means and evaluating the transmission intensity of each sample relative to the transmission intensity of the reference beam as a function of time, the method comprising:

(a) passing a polarized, collimated laser beam through said beam splitters;

(b) positioning said at least first and second samples in the path of the reflective beams respectively;

(c) positioning said at least first and second detecting means such that their central segments are in the path of the reflective beams respectively exiting said at least first and second samples, and selecting said detecting means so as to achieve an acceptance angle of less than approximately 25 milliradians relative to the path of the respective reflective beam prior to its passing through the respective at least first and second samples;

(d) detecting the transmission intensity of forward scattered light of the respective reflective beams caused by passing said reflective beams through said at least first and second samples by means of the respective central segment of said at least first and second detecting means;

(e) detecting the transmission intensity of the reference beam by means of the reference detecting means;

(f) converting the transmission intensities of said reflective beams and reference beam into respective individual digitized electrical signals by means of the processing means; and

(g) evaluating said digitized electrical signals by means of the microprocessor means according to the formula:

$$\frac{I_i(t_0 + n\Delta t) \cdot I_{REF}(t_0)}{I_i(t_0) \cdot I_{REF}(t_0 + n\Delta t)}$$

wherein I_i is the transmission intensity of the forward scattered light of the i^{th} reflective beam as detected by the i^{th} detecting means, i is an integer from 1 (first) to at least 2 (second) representing the i^{th} sample, I_{REF} is the transmission intensity of the reference beam detected by said reference detecting means, t_O is the starting time of the respective antigen-antibody reaction, n is an integer from 0 to infinity, and Δt, is the time between successive measurements of the respective reaction, thereby providing a measure of the antigen-antibody reaction of each sample as a function of time.

4,988,631

METHOD OF MAKING A PHOTOELECTRIC CONVERSION DEVICE

Minoru Ogawa; Koichiro Sakamoto; Toshiyuki Tamura, and Kazushige Katsuumi, all of Shizuoka, Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 331,079, Mar. 28, 1989, Pat. No. 4,979,007, which is a continuation of Ser. No. 61,667, Jun. 15, 1987, abandoned. This application Apr. 25, 1990, Ser. No. 514,263

Claims priority, application Japan, Jun. 17, 1986, 61-140628; May 15, 1987, 62-119349

Int. Cl.[5] H01L *27/14, 27/12*

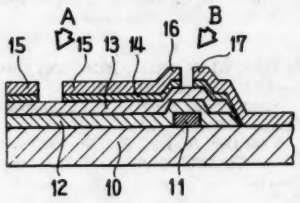
U.S. Cl. 437—4 **5 Claims**

4. A method for manufacturing a photoelectric conversion device comprising the steps of:

simultaneously forming gate electrodes for a thin film transistor portion and a reflecting film for a sensor portion on the surface of an insulating substrate by a thin film technique;

depositing an insulating film on said substrate, said gate electrodes, and said reflecting film;

depositing on said insulating film an a-Si film for said film transistor portion and said sensor portion so as to be commonly laminated thereto; and



depositing on said a-Si film electrodes for said sensor portion and said thin film transistor portion so as to be commonly laminated thereto.

4,988,632

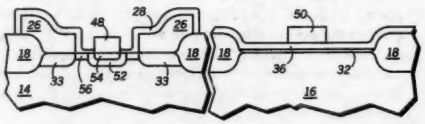
BIPOLAR PROCESS USING SELECTIVE SILICON DEPOSITION

James R. Pfiester, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 2, 1990, Ser. No. 459,845

Int. Cl.[5] H01L *21/265*

U.S. Cl. 437—31 **10 Claims**



1. A method for fabricating a bipolar transistor comprising:

providing a silicon substrate having a surface area of first conductivity type;

depositing a silicon layer of second conductivity type overlaying said surface area;

patterning said silicon layer to expose a first portion of said surface area and leaving a remaining portion of said silicon layer in contact with a second portion of said surface area adjacent said exposed portion, said remaining portion terminating at a sidewall;

forming an electrically insulating layer overlaying said remaining portion and said first exposed portion;

forming sidewall spacers of a material different from said electrically insulating layer overlaying said electrically insulating layer on said sidewall;

etching said electrically insulating layer using said sidewall spacers as an etch mask to expose a third portion of said surface area, said third portion interior to said first portion and bounded by said sidewall spacers;

depositing silicon on said third portion by a process of selective deposition;

doping said surface area overlaid by said selectively deposited silicon with dopant impurities of second conductivity determining type to form an intrinsic base region and with dopant impurities of first conductivity type to form an emitter region;

diffusing dopant impurities of second conductivity type from said silicon layer of second conductivity type into said second portion of said surface area to form an extrinsic base region;

removing said sidewall spacers to expose a forth portion of said surface area; and

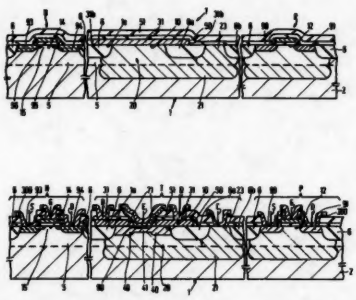
doping said forth portion with conductivity determining dopant impurities of second conductivity type to form a linking base region connecting said intrinsic and extrinsic base regions.

4,988,633

METHOD OF MANUFACTURING A SEMICONDUCTOR BI-CMOS DEVICE

Wilhelmus J. M. J. Josquin, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 6, 1990, Ser. No. 534,101
Claims priority, application United Kingdom, Jun. 16, 1989, 8913904
Int. Cl.[5] H01L *21/331, 21/336*
U.S. Cl. 437—34 18 Claims



1. A method of manufacturing a semiconductor device comprising a bipolar transistor and an insulated gate field effect transistor, which method comprises providing a semiconductor body having, adjacent to one major surface, a collector region of one conductivity type at a first device area and a first well region of the one conductivity type at a second device area, defining an insulated gate on the second device area, introducing impurities to form source and drain regions of the opposite conductivity type in the first well region, providing a layer doped with impurities of the opposite conductivity type on the first device area for forming an extrinsic base region, providing an insulating layer to cover the doped layer, forming an opening through the insulating and doped layers to expose a surface region of the first device area, and introducing through the opening impurities for forming an intrinsic base region of the opposite conductivity type and an emitter region of the one conductivity type within the intrinsic base region, characterised by forming the doped layer by providing a dopable layer on the first device area and then introducing the impurities to form the source and drain regions prior to providing the insulating layer, thereby doping the dopable layer with impurities of the opposite conductivity type, and by providing the insulating layer to cover the first and second device areas so that the insulating layer masks the second device area from the impurities for forming the intrinsic base and emitter regions.

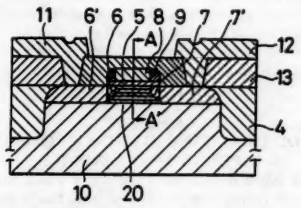
4,988,634

METHOD FOR FORMING FET WITH A SUPER LATTICE CHANNEL

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 301,135, Jan. 25, 1989, abandoned, which is a division of Ser. No. 102,841, Sep. 30, 1987, abandoned. This application Apr. 16, 1990, Ser. No. 512,026
Claims priority, application Japan, Oct. 8, 1986, 61-240544; Oct. 8, 1986, 61-240545; Oct. 8, 1986, 61-240546
Int. Cl.[5] H01L *21/268, 21/335*
U.S. Cl. 437—41 1 Claim

1. A method for forming FET's comprising
forming a first wide-energy-gap semiconductor thin film on a substrate;
forming a second narrow-energy-gap semiconductor thin film on said first semiconductor thin film;
repeating the forming steps of said first and second semiconductor thin films alternately into a superlattice structure;
forming source and drain regions which are separated from each other by a channel region constituted by said superlattice structure;



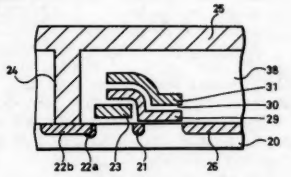
forming a gate insulating film on said channel region;
wherein said first and second semiconductor thin films are formed by photo CVD and said superlattice structure is laser annealed to enhance the crystallinity of said superlattice structure.

4,988,635

METHOD OF MANUFACTURING NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE

Natsuo Ajika, and Hideaki Arima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,144
Claims priority, application Japan, Jun. 7, 1988, 63-141040
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—43 7 Claims



1. A method for manufacturing a semiconductor memory device having a memory element with two impurity diffused regions and first and second conductive layers for storing memory information and a selecting element with two impurity diffused regions and a third conductive layer for selectively taking out information of said memory element, comprising the steps of:
forming a first oxide film on a surface of a semiconductor substrate;
forming said third conductive layer on a surface of said first oxide film;
forming a film to be etched on a surface of said third conductive layer and the surface of said first oxide film;
applying a resist on a surface of said film to be etched;
etching said resist to expose the surface of said film to be etched deposited on the surface of said third conductive layer;
etching said film to be etched and said first oxide film using said resist as a mask to form an opening portion deep enough to reach the surface of said semiconductor substrate in a region which is in contact with a side surface of said third conductive layer;
implanting ions of impurities to the surface of said semiconductor substrate using said third conductive layer and said resist as a mask;
removing said first oxide film, said film to be etched and said resist deposited on regions of said semiconductor substrate

except the region on which said third conductive layer is formed;

forming a second oxide film on the surface of said third conductive layer and on the surface of said semiconductor substrate;

depositing said first conductive layer, an interlayer insulating film and said second conductive layer on the surface of said second oxide film and patterning the same; and

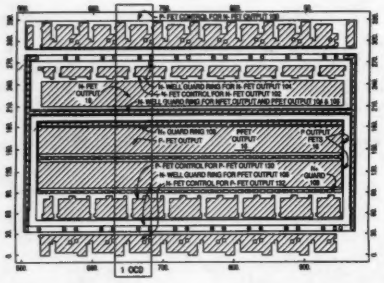
implanting ions of impurities to said semiconductor substrate using said second and third conductive layers as a mask to form a graded impurity region in the substrate.

4,988,636

METHOD OF MAKING BIT STACK COMPATIBLE INPUT/OUTPUT CIRCUITS

Robert P. Masleid, Austin, and Parsotam T. Patel, Round Rock, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 29, 1990, Ser. No. 471,892
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—51 **14 Claims**



1. A method for positioning components of a plurality of input/output circuits on a semiconductor substrate containing circuits in addition to said input/output circuits, each input-/output circuit for processing a single bit in a multiple bit group, said method comprising the steps of:

(1) dividing each input/output circuit into groups containing similar function subcomponents;

(2) forming a vertical column of subcomponents for each input/output circuit and connecting said subcomponents to perform said function;

(3) placing said columns adjacently to form a plurality of columns with like subcomponents immediately adjacent to each other forming row groups of said like subcomponents; and

(4) forming at least one guard ring around said subcomponent row group.

4,988,637

METHOD FOR FABRICATING A MESA TRANSISTOR-TRENCH CAPACITOR MEMORY CELL STRUCTURE

Sang H. Dhong, Mahopac, and Wei Hwang, Armonk, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jun. 29, 1990, Ser. No. 546,194
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—52 **9 Claims**

1. A method for fabricating a DRAM memory cell in a monocrystalline substrate, said cell including an FET transistor and a capacitor, said method comprising the steps of:

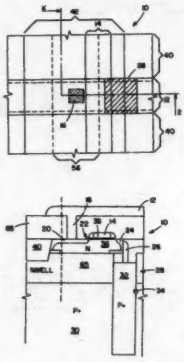
a. providing a buried storage capacitor in a trench in said substrate;

b. forming a semiconductor mesa area juxtaposed to said buried storage capacitor;

c. opening a channel to a contact of said buried storage capacitor;

d. depositing a semiconductor layer over said mesa area and in said channel;

e. removing a substantial portion of said semiconductive layer, leaving at least a connecting portion deposited in



said channel and in communication with said semiconductor mesa; and

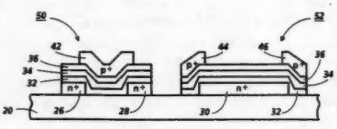
f. forming on said mesa at least a gate structure and source and drain regions, whereby said connecting portion provides a conductive path between a said region and said capacitor.

4,988,638

METHOD OF FABRICATION A THIN FILM SOI CMOS DEVICE

Tiao-Yuan Huang; Anne Chiang, both of Cupertino, and I-Wei Wu, San Jose, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 268,832, Nov. 7, 1988, Pat. No. 4,951,113.
This application Jun. 29, 1990, Ser. No. 546,288
Int. Cl.[5] H01L *21/86, 21/70*
U.S. Cl. 437—57 **2 Claims**



1. A method of fabricating a thin film SOI CMOS device comprising the steps of

providing an insulating substrate,

depositing a first doped semiconductor layer upon said substrate and patterning it to form simultaneously the source and drain elements of one transistor and the gate element of its complementary transistor,

depositing a tri-layer stack over said patterned first layer, said stack comprising a pair of intrinsic or lightly doped semiconductor layers separated by a dielectric layer,

depositing a second doped semiconductor layer upon said tri-layer stack and patterning it to form simultaneously the gate source and drain element of said one transistor and the source and drain elements of said complementary transistor, and

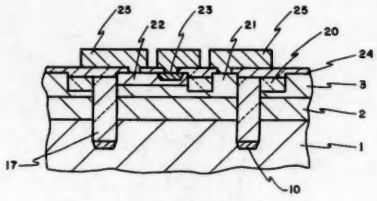
isolating said transistors into islands by removing any portion of said layers extending between said transistors.

4,988,639

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES USING TRENCH ISOLATION METHOD THAT FORMS HIGHLY FLAT BURIED INSULATION FILM

Kunio Aomura, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 28, 1989, Ser. No. 414,111
Claims priority, application Japan, Sep. 28, 1988, 63-245001
Int. Cl.[5] H01L *21/461, 21/76*
U.S. Cl. 437—67 17 Claims



1. A method of manufacturing a semiconductor device comprising the steps of:

forming a first mask over the surface of a silicon body, said first mask having an opening at a first region on the surface of said silicon body;

etching said silicon body through said first mask to form a first trench of a first depth in said first region on said silicon body;

filling a first insulating material in said first trench;

forming a second mask over the surface of said silicon body, said second mask having a first opening which simultaneously extends continuously from a second region adjacent to said first region on the silicon body surface to a part of the first region and a second opening;

etching the silicon body through said mask to simultaneously form a second trench of a second depth only in said second region on the silicon body and a third trench of said second depth on the silicon body; and

simultaneously filling a second insulating material in said second and third trenches.

4,988,640

METHOD OF DOPING AND IMPLANTING USING ARSINE, ANTIMONY, AND PHOSPHINE SUBSTITUTES

David A. Bohling, Macungie; Gregory T. Muhr, Allentown, both of Pa., and David A. Roberts, Carlsbad, Calif., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 224,089, Jul. 25, 1988, Pat. No. 4,904,616.
This application Nov. 6, 1989, Ser. No. 433,080
Int. Cl.[5] H01L *21/20, 21/265*
U.S. Cl. 437—81 16 Claims

1. In a method of n-type doping of silicon epitaxial or polycrystalline material with a Group VA metal using an organometallic dopant source containing arsenic, phosphorus or antimony, the improvement wherein said organometallic dopant is selected from the group consisting of compounds of the formula:

$$MR_1R_2R_3$$

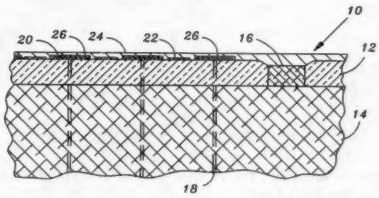
wherein M=As, P or Sb and R_1, R_2 and R_3 are each separately hydrogen or an organic radical wherein at least one R is an organic radical which is at least partially fluorinated.

4,988,641

GRAPHOTAXIALLY FORMING A PHOTOSENSITIVE DETECTOR ARRAY

Allen L. Solomon, Fullerton, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 10, 1989, Ser. No. 419,211
Int. Cl.[5] H01L *21/20*
U.S. Cl. 437—83 26 Claims



1. A method for forming a single crystalline layer upon a non-single crystalline substrate, comprising the steps of:

(a) depositing a glass layer upon the substrate;

(b) placing a seed crystal of a single crystalline material of a first type upon the glass layer;

(c) liquefying the glass layer so as to cause the seed crystal to sink into and be sealed to the glass layer; and

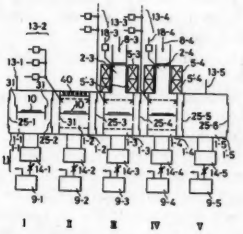
(d) growing from the seed crystal a first layer of material of a first type graphotaxially across the surface of the glass layer.

4,988,642

SEMICONDUCTOR DEVICE, MANUFACTURING METHOD, AND SYSTEM

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 198,769, May 25, 1988, abandoned, which is a division of Ser. No. 118,892, Nov. 10, 1987, abandoned. This application Dec. 1, 1989, Ser. No. 445,898
Int. Cl.[5] H01L *21/20*
U.S. Cl. 437—101 7 Claims



1. A semiconductor device manufacturing method comprising:

mounting a substrate on a substrate holder;

disposing said holder in a first reaction chamber;

carrying out a first CVD process in said first reaction chamber;

transporting said substrate holder from said first chamber to a second chamber without contacting said substrate with atmospheric air;

carrying out a second chemical reaction deposition enhanced by microwaves and a magnetic field in said second reaction chamber; and

causing an electric discharge in said second reaction chamber to further excite the excited gas to compensate for energy losses associated with the excited reactive gas prior to said second chemical reaction deposition, said

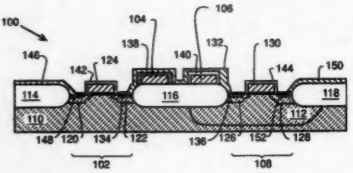
electric discharge being produced by a pair of electrodes between which the substrate is disposed such that the electric field between the electrodes is substantially perpendicular to the surface of the substrate.

4,988,643

SELF-ALIGNING METAL INTERCONNECT FABRICATION

Morris H. Tsou, San Jose, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Oct. 10, 1989, Ser. No. 419,284
Int. Cl.[5] H01L *21/90, 21/70*
U.S. Cl. 437—200 **4 Claims**



1. A method of forming a bridging interconnect between a current-carrying region of a transistor and a connection conductor so that said interconnect crosses without electrically contacting an intermediate noncontacting conductor, said current-carrying region being formed in a semiconductor substrate, said connection conductor and said noncontacting conductor being formed on said substrate, said method comprising the steps of:

(a) at least partially covering said connection conductor with an oxide-retarding material which inhibits the growth of an oxide on said conductor;

(b) growing an oxide on the structure defined by step (a) so as to form

a relatively thick oxide cover over said noncontracting conductor, and

a relatively thin oxide over said current-carrying region;

(c) etching the oxide grown in step (b) sufficiently to remove oxide from over said current-carrying region while limiting etching so that said relatively thick oxide cover over said noncontacting conductor is not completely removed;

(d) at least partially removing said oxide-retarding material from over said connection conductor;

(e) depositing a sinterable metal over the structure defined by step (d);

(f) sintering the sinterable metal deposited in step (e) so that it sinters with said current-carrying region and said connection conductor, said metal not sintering where it contacts oxide;

(g) removing unsintered metal; and

(h) defining a conductor extending from sintered metal over said current-carrying region to over said connection conductor;

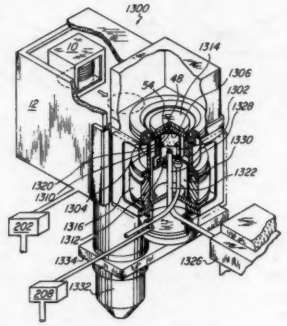
whereby, said sintered metal electrically connects said current-carrying region and said connection conductor, while remaining insulated from said noncontacting conductor by oxide grown in step (b) and not removed in step (c).

4,988,644

METHOD FOR ETCHING SEMICONDUCTOR MATERIALS USING A REMOTE PLASMA GENERATOR

Rhett B. Jucha, Celeste; Cecil J. Davis, Greenville; Steve S. Huang, Dallas; Lee M. Loewenstein, Plano, and Jeff D. Achenbach, Rowlett, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 23, 1989, Ser. No. 355,942
Int. Cl.[5] H01L *21/00, 21/02;* **B44C** *1/22;* **C03C** *15/00*
U.S. Cl. 437—225 **6 Claims**



1. A method for etching semiconductor manufacturing materials in a process chamber, with an etchant gas capable when excited of etching quartz, comprising:

(a) generating a plasma remote from and in fluid communication with the process chamber, including the steps of:

i. exciting a first gas in a plasma generator;

ii. flowing the excited first gas through an outlet in fluid communication with the generator and the process chamber;

iii. mixing said etchant gas with the excited first gas to excite the etchant gas, and then causing said mixed gas to flow into the process chamber, thereby avoiding passage of the etchant gas through the plasma generator.

4,988,645

CERMET MATERIALS PREPARED BY COMBUSTION SYNTHESIS AND METAL INFILTRATION

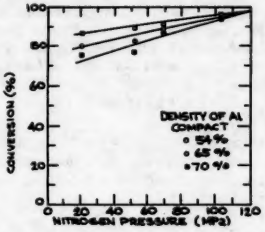
Joseph B. Holt, San Jose; Stephen D. Dunmead, Davis; Danny C. Halverson, Modesto, and Richard L. Landingham, Livermore, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 12, 1988, Ser. No. 283,440
The portion of the term of this patent subsequent to Oct. 31, 2006, has been disclaimed.
Int. Cl.[5] C04B *35/52*
U.S. Cl. 501—91 **18 Claims**

1. A method of forming a ceramic-metal composite material, comprising the steps of:

forming an infiltratable porous ceramic skeleton by self-propagating high temperature combustion synthesis of a powder compact;

substantially simultaneously infiltrating the thus-formed high temperature highly wettable ceramic skeleton with



molten metal wherein said infiltrating step utilizes combustion heat from said combustion synthesis step.

4,988,646

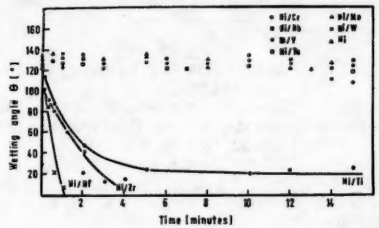
METHOD FOR PRODUCING A CERAMIC

Shyama P. Mukherjee, Vestal, N.Y., assignor to International Business Machines, Armonk, N.Y.

Continuation of Ser. No. 193,023, May 12, 1988, abandoned. This application Jul. 27, 1989, Ser. No. 385,993

Int. Cl.[5] C04B *35/00*

U.S. Cl. 501—98 **17 Claims**



1. A method for producing an aluminum nitride ceramic which comprises:

(a) obtaining a powder of aluminum nitride;

(b) contacting said powder with gel of a metallic compound that forms a low contact angle with said powder at the sintering step (d) and wherein said metallic compound include a member selected from the group of cobalt, nickel and mixtures thereof and at least one alloying member selected from the group of transition elements and rare earth elements;

removing solvents and any organic material obtained from the composition from step (b);

(d) sintering the composition from step (c) to thereby produce said ceramics.

4,988,647

REFRACTORY MASS AND PARTICLES MIXTURE FOR FORMING A REFRACTORY MASS

Léon-Philippe Mottet, Tarcienne; Pierre Robyn, Nivelles, and Pierre Laroche, Nalinnes, all of Belgium, assignors to Glaverbel, Brussels, Belgium

Division of Ser. No. 49,388, May 13, 1987, Pat. No. 4,818,574. This application Oct. 4, 1988, Ser. No. 252,934

Claims priority, application Luxembourg, May 16, 1986, 86431

Int. Cl.[5] C04B *35/65, 35/52, 35/00*

U.S. Cl. 501—99 **7 Claims**

1. The mixture of particles for use in a ceramic welding process for forming a coherent refractory mass on a surface by projecting against that surface the mixture and oxygen, the mixture comprising:

refractory particles;

fuel particles capable of reacting in an exothermic manner with oxygen to release sufficient heat to melt at least the surfaces of the refractory particles for forming the coherent refractory mass, which fuel particles are finely divided particles having a mean grain size of less than 50 μm and are comprised of at least one element which is oxidizable to form a refractory oxide and is selected from the group consisting of silicon, aluminum, and magnesium; and

carbonaceous particles comprising particles of a polymeric material, which carbonaceous particles are of such a size or composition that, when the mixture is projected against the surface in the presence of oxygen under conditions which lead to substantially complete oxidation of the fuel particles and the formation of the coherent refractory mass, the carbonaceous particles will not be completely oxidised, whereby carbon particles become occluded in the coherent refractory mass formed.

2. The mixture of particles for use in a ceramic welding process for forming a coherent refractory mass on a surface by projecting against that surface the mixture and oxygen, the mixture comprising:

refractory particles;

fuel particles capable of reacting in an exothermic manner with oxygen to release sufficient heat to melt at least the surfaces of the refractory particles for forming the coherent refractory mass, which fuel particles are finely divided particles having a mean grain size of less than 50 μm and are comprised of at least one element which is oxidisable to form a refractory oxide and is selected from the group consisting of silicon, aluminum, and magnesium; and

carbonaceous particles having a mean grain size in excess of 0.5 mm, which carbonaceous particles are of such a size or composition that, when the mixture is projected against the surface in the presence of oxygen under conditions which lead to substantially complete oxidation of the fuel particles and the formation of the coherent refractory mass, the carbonaceous particles will not be completely oxidized, whereby carbon particles become occluded in the coherent refractory mass formed.

3. A mixture of particles for use in a ceramic welding process for forming a coherent refractory mass on a surface by projecting against that surface the mixture and oxygen, the mixture comprising:

refractory particles;

fuel particles, which fuel particles are capable of reacting in an exothermic manner with oxygen to release sufficient heat to melt at least the surfaces of the refractory particles for forming the coherent refractory mass and which fuel particles are finely divided particles having a mean grain size of less than 50 μm and are comprised of at least one element which is oxidizable to form a refractory oxide and is selected from the group consisting of silicon, aluminum, and magnesium; and

carbonaceous particles, which carbonaceous particles are of such a size or composition that, when the mixture is projected against the surface in the presence of oxygen, under conditions which lead to substantially complete oxidation of the fuel particles and the formation of the coherent refractory mass, the carbonaceous particles will not be completely oxidized, whereby carbon particles become occluded in the coherent refractory mass formed,

wherein each of the carbonaceous particles is comprised of a core of carbonaceous material and a mantle comprised of a material which inhibits oxidation of the core, the mantle covering the core.

7. A mixture of particles for use in a ceramic welding process for forming a coherent refractory mass on a surface by projecting against that surface the mixture and oxygen, the mixture comprising:

refractory particles;

fuel particles, which fuel particles are capable of reacting in an exothermic manner with oxygen to release sufficient heat to melt at least the surfaces of the refractory particles

for forming the coherent refractory mass and which fuel particles are finely divided particles having a mean grain size of less than 50 μm and are comprised of at least one element which is oxidizable to form a refractory oxide and is selected from the group consisting of silicon, aluminum, and magnesium; and

carbonaceous particles, which carbonaceous particles are of such a size or composition that, when the mixture is projected against the surface in the presence of oxygen, under conditions which lead to substantially complete oxidation of the fuel particles and the formation of the coherent refractory mass, the carbonaceous particles will not be completely oxidized, whereby carbon particles become occluded in the coherent refractory mass formed,

wherein the mixture further comprises further particles comprising at least one element which is oxidizable to form a refractory oxide, which further particles are of such a size or composition that, when the mixture is projected against the surface in the presence of oxygen and under conditions which lead to substantially complete oxidation of the fuel particles and the formation of the coherent refractory mass, such further particles will not be completely oxidized, whereby unoxidized portions of the further particles become occluded in the refractory mass, and

wherein the further particles comprise a core comprised of the at least one element which is oxidizable to form a refractory oxide and a mantle comprised of a material which inhibits oxidation of the core, which mantle covers the core.

4,988,648

HOMOGENEOUS SOLID SOLUTION MATERIAL AND METHOD OF MANUFACTURING THE SAME

Ogura Atsushi, Kamakura, Japan, assignor to Okura Techno-Research Kabushiki Kaisha, Tokyo, Japan

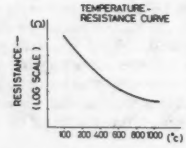
Continuation of Ser. No. 930,333, Nov. 12, 1986, abandoned. This application Oct. 18, 1988, Ser. No. 259,400

Claims priority, application Japan, Nov. 29, 1985, 60-267199; Jun. 13, 1986, 61-136162

The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

Int. Cl.[5] C04B *35/26, 35/40*

U.S. Cl. 501—126 **8 Claims**



1. A ferrite-ceramic material consisting essentially of a homogeneous solid solution of a precipitated ferrite and a ceramic prepared by melting and cooling ferrite-ceramic composite particles having a ceramic particle with a surface film formed of a precipitated crystalline ferrite reacted and precipitated in a reduction reaction of complex ferrite ions.

4,988,649

SILICA BRICKS AND PROCESS FOR PRODUCTION THEREOF

Klaus Santowski, Pleitersheim; Hermann Leupold, Walluf, and Alois Angeler, Bonn, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Nov. 16, 1989, Ser. No. 437,440

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1989, 3908124

Int. Cl.[5] C04B *35/14*

U.S. Cl. 501—133 **8 Claims**

1. A process for producing silica bricks having a bulk density equal to or greater than 1.86 g/cm^3, an open porosity of less than 20 volume percent, and thermal conductivity of the following mean values:

at 400° C. : 2.2 W/mk

at 700° C. : 2.3 W/mk

at 1000° C. : 2.6 W/mk

at 1200° C. : 3.0 W/mk

which comprises providing a mixture containing quartzite and elemental silicon, shaping said mixture into bricks and firing said bricks, the improvement wherein said mixture contains 0.5 to 10 weight percent of elemental silicon in a particle size up to 75 microns and 1.5 to 8 percent of finely divided, amorphous, pyrogenic silicon dioxide based on the total weight of said quartzite, elemental silicon and pyrogenic silicon dioxide.

4,988,650

AUXILIARY AGENT FOR SINTERING CERAMIC MATERIAL

Hiroshi Takagi, Ohtsu, and Yukio Sakabe, Kyoto, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jun. 23, 1989, Ser. No. 370,464

Int. Cl.[5] C04B *35/46*

U.S. Cl. 501—134 **5 Claims**

1. A ceramic sintering aid, comprising a basic composition which comprises:

(a) 5 to 40 mol % of at least two oxides selected from the group consisting of ZnO, SnO and MnO, the sum of the contents of ZnO and MnO being not less than 5 mol %,

(b) 5 to 40 mol % of at least one metal oxide expressed by the general formula: RO where R is at least one element selected from the group consisting of Ba, Sr, Ca and Mg, and

(c) 30 to 70 mol % of (Ti, Si)O_2, the content of SiO_2 in the (Ti, Si)O_2 being not less than 15 mol %.

4,988,651

TEMPERATURE COMPENSATING DIELECTRIC CERAMIC COMPOSITION

Goro Nishioka, Nishinomiya; Yukio Sakabe, Kyoto, and Masayuki Yamada, Takefu, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 27, 1989, Ser. No. 428,201

The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.[5] C04B *35/46, 35/49*

U.S. Cl. 501—135 **7 Claims**

1. A temperature compensating dielectric ceramic composition consisting essentially of a solid solution composed of barium oxide, silicon oxide, zirconium oxide, and at least one oxide selected from the group consisting of titanium oxide and tin oxide, said components, when calculated in terms of BaO, SiO_2, ZrO_2 TiO_2 and SnO_2 respectively and expressed by the formula:

$$xBaO\text{-}ySiO_2\text{-}z\{ZrO_{2(1-\beta)}TiO_{2(\beta1)}SnO_{2(\beta2)}\}$$

(wherein x, y and z are weight percentages of respective components, $x+y+z=100$, $\beta=\beta 1+\beta 2$, $0 \leqq \beta_1$, $0 \leqq \beta_2$, $0.01 \leqq \beta \leqq 0.30$), having compositional proportions falling within the polygonal area defined by the points A, B, C and D in FIG. 1, the sets of x, y and z at said points A, B, C and D being as follows:

	x	y	z
A	50	49	1
B	50	20	30
C	15	20	65
D	15	84	1

4,988,652

PROCESS FOR RECOVERING CATALYST FOR USE IN PREPARING α-(4-ISOBUTYLPHENYL)PROPIONIC ACID

Yoshikazu Shima; Kazuo Tanaka, and Yoshifumi Sato, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Filed Dec. 26, 1989, Ser. No. 456,313
Claims priority, application Japan, Mar. 16, 1989, 1-62154
Int. Cl.[5] B01J *38/68, 31/40;* C01G *53/02;* C07C *51/12*
U.S. Cl. 502—24 22 Claims

1. A process for recovering a catalyst comprising a nickel compound, a phosphine compound and an iodine compound used in the preparation of α-(4-isobutylphenyl)propionic acid by reacting α-(4-isobutylphenyl)ethyl alcohol with carbon monoxide to prepare a reaction product mixture comprising reaction products and catalyst components, which process comprises (a) recovering a part of the nickel compound as nickel carbonyl from a purge gas by collection of the nickel compound in a cold trap, (b) adding an organic solvent selected from the group consisting of hydrocarbons, ethers and esters to a concentrate of the reaction product mixture to extract the reaction products, wherein the extraction is carried out at 0° to 120° C. and (c) separating and recovering the majority of the catalyst components from the resultant extraction residue.

4,988,653

ELUTRIABLE MULTI COMPONENT CRACKING CATALYST MIXTURE AND A PROCESS FOR CATALYTIC CRACKING OF HEAVY HYDROCARBON FEED TO LIGHTER PRODUCTS

Joseph A. Herbst, Turnersville; Hartley Owen, Belle Mead, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 30, 1988, Ser. No. 292,272
Int. Cl.[5] B01J *29/06*
U.S. Cl. 502—67 18 Claims

1. A catalytic cracking catalyst mixture comprising catalytically effective amounts of a blend of:

(a) a cracking catalyst of a large pore molecular sieve in a matrix, and

(b) an additive catalyst, separable by physical means from the cracking catalyst, comprising a shape selective zeolite having a constraint index of 1–12, being substantially free of hydrogenation/dehydrogenation components, and having paraffin cracking/isomerization activity, a shape selective zeolite having a constraint index of 1–12 and having paraffin aromatization activity and a matrix.

4,988,654

DUAL COMPONENT CRACKING CATALYST WITH VANADIUM PASSIVATION AND IMPROVED SULFUR TOLERANCE

James V. Kennedy, Greenbrae, and Lawrence W. Jossens, Albany, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 29, 1989, Ser. No. 459,094
Int. Cl.[5] B01J *29/04*
U.S. Cl. 502—84 19 Claims

1. A dual component catalyst composition for the catalystic cracking of metal-containing hydrocarbonaceous feedstock comprises:

(1) A first component comprising an active cracking catalyst; and

(2) A second component, as a separate and distinct entity, said second component comprising the following materials.

(a) A calcium and magnesium containing material selected from the group consisting of dolomite, substantially amorphous calcium magnesium silicate, calcium magnesium oxide, calcium magnesium acetate, calcium magnesium carbonate, and calcium magnesium subcarbonate;

(b) A magnesium containing material comprising a hydrous magnesium silicate; and

(c) A binder selected from the group consisting of kaolin, bentonite, montmorillonite, saponite, hectorite, alumina, silica, titania, zirconia, silica-alumina, and combinations thereof;

wherein the weight ratio of material (a) to material (b) is from about 80:20 to about 20:80 and said binder comprises from about 5 to 30% by weight of said second component based on the total weight of said second component; wherein said material (a) substantially transforms under cracking conditions to active compounds for metal trapping.

4,988,655

POLYOLEFIN POLYMERIZATION CATALYST AND METHOD OF PRODUCTION USE

Kent E. Mitchell, Bartlesville; Gil R. Hawley, Dewey, and Don W. Godbehere, Ochelata, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 30, 1989, Ser. No. 443,690
Int. Cl.[5] C08F *4/642*
U.S. Cl. 502—108 19 Claims

1. A process for the preparation of a catalyst suitable for the polymerization of an α-olefin, said process comprising

(a) forming a first component by reacting reactants comprising a magnesium dihalide, a phenol, an alkylbenzoate, and a titanium tetrahydrocarbyloxide;

(b) reacting said first component with an organoaluminum halide comprising ethylaluminum sesquichloride to produce a solid product; and

(c) then contacting the resulting solid product with an activating liquid comprising titanium tetrachloride and trichlorosilane in a confined zone under pressure of at least about 70 psi.

4,988,656

OLEFIN POLYMERIZATION CATALYST

Gregory G. Arzoumanidis; Nicholas M. Karayannis; Habet M. Khelghatian, all of Naperville; Sam S. Lee, Hoffman Estates, all of Ill., and Bryce V. Johnson, Mound, Minn., assignors to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 186,359, Apr. 25, 1988, Pat. No. 4,866,022, which is a continuation of Ser. No. 55,430, May 28, 1987, abandoned, which is a continuation-in-part of Ser. No. 875,180, Jun. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 741,858, Jun. 6, 1985, Pat. No. 4,612,299, which is a continuation-in-part of Ser. No. 629,106, Jul. 9, 1984, abandoned, and a continuation-in-part of Ser. No. 592,910, Mar. 23, 1984, Pat. No. 4,540,679. This application May 12, 1989, Ser. No. 351,408

The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.

Int. Cl.[5] C08F *4/646*

U.S. Cl. 502—127 18 Claims

1. A solid, hydrocarbon-insoluble alpha-olefin polymerization catalyst component comprises a product formed by:

A. Forming a solution of a magnesium carbonate or a magnesium carboxylate;

B. Precipitating solid particles from such magnesium-containing solution by treatment with a transition metal halide and a morphology affecting component;

C. Reprecipitating such solid particles from a mixture containing a cyclic ether; and

D. Treating the reprecipitated particles with a transition metal compound and an electron donor.

4,988,657

PROCESS FOR OLEFIN POLYMERIZATION

Shirley J. Martin; Elizabeth A. Benham; Max P. McDaniel, and Bruce W. Gerhold, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 6, 1989, Ser. No. 417,954

Int. Cl.[5] C08F *4/24*

U.S. Cl. 502—158 17 Claims

6. A process to produce a catalyst composition suitable for simultaneously producing olefins and olefin polymer of controlled polymer density said process comprising:

(a) containing poly(methylhydrogen)siloxane or a silane compound of the formula $R_{4-n}SiH_n$, wherein n=1, 2, 3, or 4 and R is chosen from aliphatic and aromatic radicals of one or more carbon atoms;

(b) with a previously oxidized and subsequently carbon monoxide reduced catalyst system comprising chromium supported on a refractory metal oxide thereby producing a catalyst composition suitable for simultaneously producing olefins and olefin polymer of controlled polymer density.

4,988,658

DIMERIZATION PROCESS AND CATALYSTS THEREFOR

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 17, 1989, Ser. No. 380,574

Int. Cl.[5] B01J *21/18*

U.S. Cl. 502—174 5 Claims

1. A composition comprising:

(a) elemental sodium; and

(b) a support comprising potassium carbonate within the range of about 15 to about 65 weight percent, sodium carbonate within the range of about 5 to about 25 weight percent, and at least one alumina-containing compound within the range of about 20 to about 80 weight percent, all based on the total weight of the support;

wherein component (a) is supported on component (b).

4,988,659

SILICA/ALUMINA COGEL CATALYSTS

Theresa A. Pecoraro, Danville, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 275,470, Nov. 23, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 440,556

Int. Cl.[5] B01J *21/12*

U.S. Cl. 502—235 22 Claims

1. A catalyst composition comprising a cogelled, silica-alumina cogel prepared by the method which comprises:

a. mixing a silicate solution with an aqueous solution of an acid aluminum salt and an acid, to form an acidified silica sol in said aluminum salt solution, and adjusting said silica sol/aluminum salt solution mixture to a pH in the range of about 1 to 4;

b. slowly adding sufficient base with vigorous stirring, to said acidified silica sol/aluminum salt solution mixture to form a cogel slurry of silica and alumina, and to adjust said slurry to a pH in the range of about 5 to 9;

c. aging said cogel slurry at a temperature of ambient to 95° C.;

d. adjusting the pH of said cogel slurry to about 5–9;

e. recovering a cogelled mass from said slurry;

f. washing said cogelled mass;

g. adjusting the pH of said cogelled mass to between about 4 and 7, and controlling conditions to induce syneresis; and

h. forming said combination into particles.

4,988,660

DOUBLE PEROVSKITE CATALYSTS FOR OXIDATIVE COUPLING

Kenneth D. Campbell, Charleston, W. Va., assignor to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 25, 1990, Ser. No. 542,699

Int. Cl.[5] B01J *23/10, 23/78, 23/84*

U.S. Cl. 502—303 5 Claims

1. A catalyst suitable for oxidative coupling of alkanes comprising a catalytically-active amount of double perovskite of the empirical formula $LnAMnTO_6$ wherein A is one or more alkaline earth elements; Ln is one or more of lanthanum, cerium, neodymium, samarium, praseodymium, gadolinium and dysprosium and T is one or more of iron, cobalt and nickel, and alkali metal component in an amount sufficient to enhance selectivity to higher hydrocarbons.

4,988,661

STEAM REFORMING CATALYST FOR HYDROCARBONS AND METHOD OF PRODUCING THE CATALYST

Hiromichi Arai, Fukuoka; Jun Kitagawa, and Yasuo Nishioka, both of Shimonoseki, all of Japan, assignors to Catalysts and Chemicals Inc., Far East, Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,498

Claims priority, application Japan, Sep. 9, 1988, 63-224802

Int. Cl.[5] B01J *21/04, 23/58, 23/78, 23/89*

U.S. Cl. 502—327 11 Claims

1. A steam reforming catalyst for hydrocarbons having at least one of nickel oxide, cobalt oxide and a platinum group noble metal supported on a carrier, the carrier consisting essentially of aluminum oxide Al_2O_3, a metal oxide expressed by MeO and a forming additive, the metal oxide MeO and aluminum oxide Al_2O_3 being present in a mol ratio of about (11.1–17.6):100 in the form of a complexed oxide expressed mainly as $MeO.6Al_2O_3$, Me being at least one metal selected

from the group consisting of calicium Ca, barium Ba and strontium Sr.

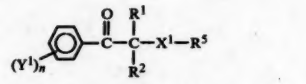
4,988,662

THERMOSENSITIVE RECORDING SHEET

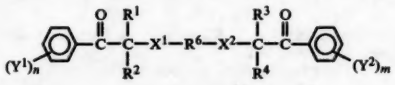
Kikuo Tsuchiya, Nishinomiya; Masaji Inagaki, Ashiya, and Shingo Araki, Kobe, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,674
Claims priority, application Japan, Apr. 27, 1988, 63-102441
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—208 11 Claims

1. A thermosensitive recording sheet comprising a substrate sheet and coated on the substrate, a film comprising a color-forming lactone compound, an acidic substance and a sensitizer, wherein the sensitizer is at least one compound selected from the group consisting of the phenacyl ether compounds and phenacyl sulfide compounds represented by the following general formulas (I) and (II)



(I)



(II)

wherein X^1 and X^2 represent an oxygen atom or a sulfur atom; Y^1 and Y^2 represent a hydrogen atom, a halogen atom, an alkyl group, an aryl group, an alkyloxy group, an acyl group, a hydroxyl group or a nitro group; R^1, R^2, R^3 and R^4 represent a hydrogen atom, a halogen atom or an alkyl group; R^5 represents an aryl group, an aralkyl group, a phenacyl group, a cycloalkyl group, an acyl group, a furfuryl group or a pyridyl group; R^6 represents a phenylene group, an alkylene group, a xylylene group, or an alkylene group containing in the chain an ether bond, a sulfide bond or an ester bond; with the proviso that the aryl group, aralkyl group, phenacyl group, cycloalkyl group, phenylene group, alkylene group and xylylene group defined for Y^1, Y^2, R^5 and R^6 may have substituents; and n and m represent an integer of 1–5.

4,988,663

HEAT SENSITIVE PAPER

Norihiko Nakashima, and Sadashi Ueda, both of Utsunomiya, Japan, assignors to Kao Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 237,230, Aug. 26, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 443,163
Claims priority, application Japan, Aug. 27, 1987, 62-213522
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—226 5 Claims

1. A heat sensitive paper comprising;

(a) a base paper,

(b) a coating layer on said base paper formed from an aqueous dispersion containing acrylic particles having an average diameter of 0.001 to 0.05 microns said aqueous dispersion being prepared by the following steps;

(i) polymerizing a monomer having a salt-forming group and a polymerizable double bond and a copolymerizable monomer in a hydrophilic organic solvent,

(ii) neutralizing the salt-forming group by adding a neutralizing agent to the polymer solution, and

(iii) adding water to the polymer solution and distilling away the hydrophilic organic solvent, and

(c) a heat sensitive color developing layer comprising a colorless or light color electron donative dye and an electron acceptant compound which reacts with said electron donative dye to develop color, on said coating layer.

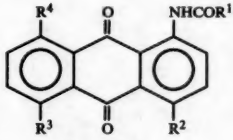
4,988,664

THERMAL TRANSFER IMAGING USING ALKYLCARBONYLAMINO-ANTHRAQUINONE DYES

Terrance P. Smith; Krzysztof A. Zaklika; Susan K. Jongewaard, and Louis M. Leichter, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 21, 1989, Ser. No. 384,770
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 12 Claims

1. A process for the thermal dye transfer of an image comprising placing a thermal dye transfer imaging element comprising a uniform layer of both a binder and an anthraquinone dye in contact with a receptor surface, said layer of both a binder and dye in contact with said receptor surface, imagewise heating areas of 0.0001 square inches or less of said layer with sufficient energy for a few milliseconds to transfer said dye to said receptor surface and thereby form an image, said layer of said thermal dye transfer dry imaging element being bound to a non-porous substrate having a total thickness of less than 50 microns and said dye having a melting point below 200° C. and a central nucleus of the general structure:



where R^1 is an alkyl group, R^2, R^3, and R^4 are independently selected from hydrogen and RCONH—, wherein the groups R are independently selected from alkyl groups, provided that at least one of the alkyl groups R and R^1 contains a total of at least 4 carbon atoms.

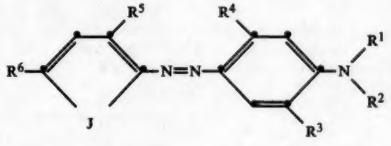
4,988,665

ARYLAZOANILINE BLUE DYES FOR COLOR FILTER ARRAY ELEMENT

Helmut Weber, Webster, and Steven Evans, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1989, Ser. No. 353,568
Int. Cl.[5] B41M 5/035, 5/26
U.S. Cl. 503—227 18 Claims

1. A thermally-transferred color filter array element comprising a transparent support having thereon a thermally-transferred image comprising a repeating mosaic pattern of colorants in a receiving layer, one of said colorants being a phenyl or thienyl azoaniline blue dye having the following formula:



wherein

R^1 and R^2 each independently represents hydrogen; a substituted or unsubstituted alkyl group of from 1 to about 6 carbon atoms; a cycloalkyl group of from about 5 to about 7 carbon atoms; or a substituted or unsubstituted aryl or hetaryl group of from about 6 to about 10 carbon atoms;

R^3 represents hydrogen or a substituted or unsubstituted alkyl or alkoxy group of from 1 to about 10 carbon atoms;

R^2 may be taken together with R^1 to form a 5- to 6-membered ring;

R^1 or R^2 may be combined with R^3 or may be joined to the carbon atom of the benzene ring at a position ortho to the position of attachment of the anilino nitrogen to form a 5- or 6-membered ring;

R^4 represents hydrogen, a substituted or unsubstituted alkyl or alkoxy group of from 1 to about 10 carbon atoms, halogen, sulfonamido or acylamido;

R^5 represents nitro, cyano, fluorosulfonyl, alkylsulfonyl, arylsulfonyl, acyl, alkoxycarbonyl, carbamoyl, sulfamoyl, trifluoromethyl or halogen;

R^6 represents nitro, cyano, acyl, trifluoroacetyl, dicyanovinyl or tricyanovinyl; and J represents -S- or $-CH=CR^5-$.

4,988,666

THERMAL DYE TRANSFER SHEET

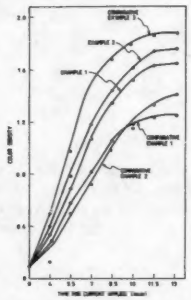
Nobuyoshi Taguchi; Akihiro Imai, both of Ikoma; Yukichi Murata, Sagamihara, and Takao Hirota, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation and Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 23, 1988, Ser. No. 276,103

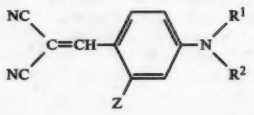
Claims priority, application Japan, Nov. 25, 1987, 62-296451

Int. Cl.[5] B41M *5/035, 5/26*

U.S. Cl. 503—227 **18 Claims**

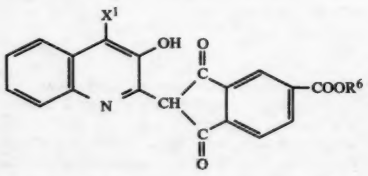


1. A thermal yellow-dye transfer sheet that comprises a base film having there on a dye layer comprising a yellow dye dispersed in a binder, said yellow dye comprising at least one dye represented by the following general formula (II) and at least two dyes represented by the following general formula (III) and/or the following general formula (IV):



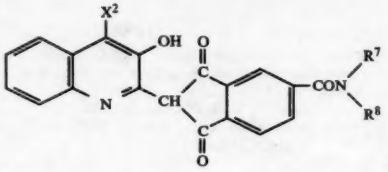
[II]

(where Z is hydrogen, chlorine or lower alkyl, and R^1 and R^2 each represents a substituted or unsubstituted alkyl, cycloalkyl, allyl, or a substituted or unsubstituted aryl);



[III]

(where X^1 is hydrogen or halogen, and R^6 is alkyl, alkoxyalkyl, aralkyloxyalkyl, allyloxyalkyl, aryloxyalkyl, tetrahydrofurfuryl, furfuryl, cycloalkyl, allyl or aralkyl); and



[IV]

(where X^2 is hydrogen or halogen, and R^7 and R^8 each represents hydrogen, alkyl, alkoxyalkyl, cycloalkyl, allyl, an optionally substituted aryl, aralkyl, furfuryl, tetrahydrofurfuryl or hydroxyalkyl).

4,988,667

RESISTIVE RIBBON WITH LUBRICANT SLIPPING LAYER

Michael E. Long, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1989, Ser. No. 446,503

Int. Cl.[5] B41M *5/35, 5/20*

U.S. Cl. 503—227 **20 Claims**

15. In a process of forming a dye-transfer image comprising:

(a) bringing into contact (i) a dye-receiving element and (ii) a dye-donor element comprising a resistive support bearing a slipping layer on one side of the resistive support and a conductive layer and a dye-containing layer on the other side of the resistive support, and

(b) imagewise supplying current to said dye-donor element to resistively heat said dye-donor element thereby causing dye from said dye-containing layer to be transferred from said dye-donor element to said dye-receiving element to form said dye-transfer image,

the improvement wherein said slipping layer comprises a liquid lubricant.

4,988,668

TI-CA-BA-CU-D COMPOSITIONS ELECTRICALLY SUPERCONDUCTING ABOVE 120 DEGREES K AND PROCESSES FOR THEIR PREPARATION

Edward M. Engler; Victor Y. Lee; Adel I. Nazzal, and Stuart S. P. Parkin, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 165,330, Mar. 8, 1988, Pat. No. 4,870,052.

This application Mar. 22, 1989, Ser. No. 327,203

Int. Cl.[5] C01F *11/02;* **C01G** *3/02, 15/00*

U.S. Cl. 505—1 **10 Claims**

1. A process for making stable, bulk, electrical superconductors with zero resistance above 120° K. confirmed with magnetic susceptibility measurements, said process comprising the steps of mixing the metal oxides in the ratio $Tl_{0.75-1.25}Ca_{2-3}Ba_{0.75-1.25}Cu_{2-3}$; forming into pellets which are placed in an inert crucible and sealed in a closed vessel in an oxygen atmosphere; heating in a preheated oven for 1–5 hours at 850°–900° C.; and cooling to room temperature over a period of 1–5 hours.

4,988,669

ELECTRICAL CONDUCTOR IN WIRE OR CABLE FORM COMPOSED OF A SHEATHED WIRE OR OF A MULTIPLE-FILAMENT CONDUCTOR BASED ON A CERAMIC HIGH-TEMPERATURE SUPERCONDUCTOR

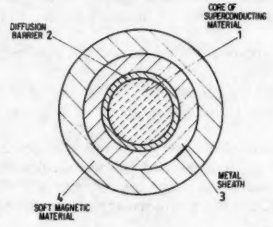
Helmut Dersch, Würenlos, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Jun. 26, 1989, Ser. No. 371,296

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1988, 3822684

Int. Cl.[5] H01B *12/00*

U.S. Cl. 505—1 8 Claims



1. An electrical conductor in wire or cable form, comprising:

a plurality of filamentary conductors each comprising a core of a ceramic high-T_c superconducting material, said core being sheathed with a metal sheath which serves as mechanical support and emergency current conductor;

wherein each of said filamentary conductors is separately embedded in and surrounded by a common matrix made of a soft magnetic material having a permeability of at least 10 and a saturation of magnetic induction of at least 0.2 tesla.

4,988,670

METHOD OF FORMING OXIDE SUPERCONDUCTING FILMS BY IN-SITU ANNEALING

Hideo Itozaki; Saburo Tanaka; Nobuhiko Fujita; Shuji Yazu, and Tetsuji Jodai, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 218,227, Jul. 13, 1988, abandoned. This application Jan. 24, 1990, Ser. No. 470,436

Claims priority, application Japan, Jul. 13, 1987, 62-174459; Sep. 16, 1987, 62-231272

Int. Cl.[5] B05D *5/12*

U.S. Cl. 505—1 18 Claims

1. In a process for preparing a compound oxide type superconducting thin film including the steps comprising depositing a thin film of compound oxide on a substrate and then subjecting the thin film of compound oxide to a heat-treatment in the presence of oxygen gas, the improvement characterized in that said heat-treatment is carried out in a same chamber in which the thin film of compound oxide is deposited on the substrate without taking the substrate out of said chamber and in that said heat-treatment is effected before any cooling of the thin film below its transition point by the steps comprising heating the thin film deposited on the substrate at a temperature ranging from 700° to 900° C. for more than 6 minutes, cooling the thin film at a cooling rate of less than 100° C./min, and then keeping the thin film at a temperature ranging from 300° to 500° C. for more than 6 minutes.

4,988,671

PROCESS FOR PRODUCING A SUPERCONDUCTIVE COMPLEX METAL OXIDE

Robert E. Johnson, Hoboken, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 51,803, May 20, 1987. This application May 15, 1989, Ser. No. 351,208

Int. Cl.[5] H01B *12/00, 1/08;* C01F *11/00, 17/00*

U.S. Cl. 505—1 18 Claims

1. A process for producing a superconductive complex metal oxide composition of the formula $A_{2-x}B_xCO_y$ wherein

A is a Group IIIB metal including the lanthanide series metals

B is a Group IIA metal

C is a metal selected from the group consisting of Cr, V, Mn, Co, Ni, and Cu and wherein $O<X<1$ and $2\leqq Y\leqq 5$; comprising annealing in molecular oxygen at temperatures of at least 800° C. a precursor composition containing at least one bimetallic complex of A[CZ] or B[CZ] wherein Z is a ligand associated with C and where the precursor composition contains the correct stoichiometric amounts of A, B and C to yield a superconductive oxide.

4,988,672

METHOD OF FORMING OXIDE SUPERCONDUCTING LAYERS BY SOLID STATE DIFFUSION

Jan W. Severin; Gijsbertus De With; Dagobert M. De Leeuw, and Cornelis A. H. A. Mutsaers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 223,452, Jul. 2, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 474,697

Claims priority, application Netherlands, Jul. 29, 1987, 8701788

Int. Cl.[5] B05D *5/12*

U.S. Cl. 505—1 7 Claims

1. A method of manufacturing a thin layer of an oxide superconductive material on a non-superconductive oxide base, said method comprising mechanically contacting two starting non-superconductive substances, which react together to form a superconductive oxide material, said starting substances being provided as a thin layer of an oxide non-superconductive substance on an oxide non-superconductive substance base and heating in an oxidizing atmosphere, said starting substances while in mechanical contact with each other thereby causing diffusion in a solid state reaction to take place between said starting substances and causing said superconductive thin layer of an oxide material to form on said non-superconductive base.

4,988,673

METHOD FOR PRODUCING SILVER COATED SUPERCONDUCTING CERAMIC POWDER

William Ferrando, Arlington, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 2, 1989, Ser. No. 389,220

Int. Cl.[5] H01L *39/12;* B05D *5/12*

U.S. Cl. 505—1 15 Claims

1. A process for coating superconducting ceramic powders with silver metal comprising:

(1) coating superconducting ceramic powder particles with $AgNO_3$;

(2) heating the $AgNO_3$-coated superconducting ceramic powder at a temperature above the melting point of $AgNO_3$ but below the decomposition temperature of $AgNO_3$ until the $AgNO_3$ melts and forms a uniform coating over the surfaces of the superconducting ceramic particles; and

(3) heating the molten $AgNO_3$-coated superconducting ceramic powder at a temperature from the decomposition temperature of $AgNO_3$ to 50° C. below the melting point of the superconducting ceramic powder until the $AgNO_3$ decomposes to form a thin, uniform coating of silver metal

over the surfaces of the superconducting ceramic powder particles;

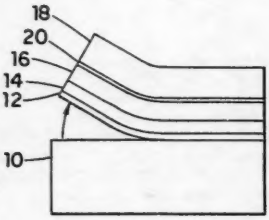
wherein an amount of $AgNO_3$ is used in step (1) which will produce upon decomposition a silver metal coated superconducting ceramic powder composite comprising from about 1 to about 25 weight percent silver metal with the remainder being the superconducting ceramic.

4,988,674

ELECTRICALLY CONDUCTIVE ARTICLES AND PROCESSES FOR THEIR FABRICATION

Jose M. Mir, Webster and Liang-sun Hung, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 9, 1989, Ser. No. 308,297
Int. Cl.[4] B32B *9/00*
U.S. Cl. 505—1 35 Claims



1. An article comprised of:

a refractory substrate,

a flexible electrically conductive crystalline cuprate layer,

a release layer interposed between said flexible conductive cuprate layer and said substrate, said release layer being comprised of at least one of the metals of groups 8 to 11 and periods 5 and 6 of the periodic table of elements,

a flexible organic film, and

means for adhesively bonding said flexible organic film to said flexible conductive cuprate layer, so that said release layer, said flexible conductive cuprate layer, said adhesive bonding means and said flexible organic film can be stripped from said refractory substrate to form a flexible electrically conductive article.

4,988,675

METHOD FOR PREVENTING SECONDARY EFFECTS

Ernst R. Froesch, Erlenbach; Hans-Peter Guler, Adlisevil, Christoph Schmid, Zurich, Jürgen Zapf, Zurich, all of Switzerland, assignors to Ciba. Geigy Corporation, Ardsley, N.Y.

Filed Jan. 25, 1989, Ser. No. 301,680
Claims priority, application Switzerland, Feb. 5, 1988, 88810072
Int. Cl.[4] A61K *37/26*; A61K*37/36*
U.S. Cl. 514—4 10 claims

1. A method for treating and preventing secondary effects of hyperinsulinemia in diabetics treated with insulin, characterized in that an effective amount of IGF I and a lower than normal amount of insulin is administered.

4,988,676

CELLULAR PROLIFERATION T CELL SUPPRESSOR FACTOR

Chris Platsoucas, Houston, Tex., assignor to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Continuation-in-part of Ser. No. 609,273, May 11, 1984, abandoned.
This application Jul. 13, 1988, Ser. No. 218,620
Int. Cl.[5] A61K *37/02*
U.S. Cl. 514—21 10 Claims

1. Purified human suppressor factor isolated from human lymphoblastoid tumor cell supernatant where it is constitutively found and characterized by:

(a) suppression of mitogen, antigen or alloantigen driven cellular proliferation of human peripheral blood leukocytes;

(b) suppression of antibody production, synthesis and secretion;

(c) molecular weight range of 55,000 to 70,000 daltons;

(d) suppression of cellular proliferative response of T and B cells;

(e) suppression of cellular proliferative response driven by alloantigens, antigens and mitogens selected from the group consisting of pokeweed mitogen (PWM), concanavalin A (CON A), phytohemagglutinin (PHA), and mixtures thereof;

(f) inhibition of proliferative response of human peripheral blood mononuclear leukocytes to allogeneic cells in mixed lymphocyte cultures;

(g) inhibition of proliferation of tumor cell lines;

(h) having no effect on natural killer cells cytotoxicity;

(i) inhibition of antibody production in vitro by human peripheral blood mononuclear leukocytes exposed to PWM;

(j) not affecting the viability of human peripheral blood mononuclear leukocytes in culture;

(k) not causing lysis of K-562 leukemic cell targets as determined by chromium release assay; and

(l) not inducing the differentiation of suppressor T-cells.

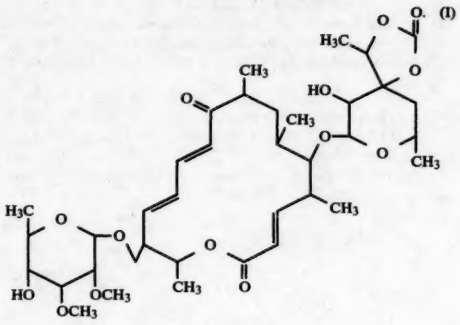
4988677

MACROLIDE ANTIBIOTIC AND IT'S USE AS A MEDICINAL AGENT

Christopher M.M. Franco; Julia Gandhi; Sugata Chatterjee; Goukanapalli C.S. Reddy; Bimal N. Ganguli; Richard H. Rupp, all of Bombay, India; Herbert Kogler and Hans-Wolfram Fehlhaber, Idstein, both of Fed. Rep of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629063
Int. Cl.[4] A 61K *31/71*; C07H *17/08*
U.S. Cl. 514—30 4 Claims

1. A compound of the formula I:



(I)

3. A method of treating infections caused by bacteria, mycoplasma or actinomycetes in a mammal by administering to a mammal an effective amount of the compound as defined in claim 1.

4,988,678

COMBINATIONS OF FU AND BVU AS ANTI-ADENOCARCINOMA AGENTS

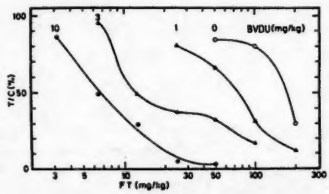
Erik De Clercq, Leuven, Belgium, and Masaaki Iigo, Kitamoto, Japan, assignors to Stichting Rega VZW, Leuven, Belgium

Division of Ser. No. 154,193, Feb. 11, 1988, Pat. No. 4,894,365. This application Jun. 29, 1989, Ser. No. 373,824

Claims priority, application Netherlands, Feb. 13, 1987, 8700366

Int. Cl.[5] A61K *31/70, 31/505*

U.S. Cl. 514—50 8 Claims



1. A medicine for the treatment of adenocarcinomas, comprising an effective amount of an active ingredient to reduce adenocarcinoma tumor weight , in a patient ingredient being selected from the group consisting of 5-fluorouracil and N_1-(2'-tetrahydrofuryl)-5-fluorouracil, in combination with an effective amount of an ingredient to potentiate the antitumor activity of said active ingredient, said potentiating ingredient being selected from the group consisting of (e)-5-(2-bromo-binyl)-uracil and (E)-5-(2-bromovinyl)-2'-deoxyuridine, and a pharmaceutically acceptable carrier therefor.

4,988,679

LIQUID SUSTAINED RELEASE COMPOSITION

Leonard Chavkin, R.R. 1, P.O. Box 90, Bloomsbury, N.J. 08804, and Leonard Mackles, 311 E. 23rd St., New York, N.Y. 10010

Continuation-in-part of Ser. No. 293,194, Jan. 3, 1989. This application Jun. 19, 1989, Ser. No. 367,851

Int. Cl.[5] A61K *31/715, 47/00, 31/61*

U.S. Cl. 514—53 19 Claims

1. An orally ingestible liquid composition for suspending therein at least one orally administrable pharmaceutically active composition, said composition being releasable over an extended time period comprising:

(i)

(a) about 30 to about 90 parts by weight of a member selected from the group consisting of at least one triglyceride of a medium chain length alkanoic acid wherein the said acid has between 8 and 10 carbon atoms in the chain and distilled acetylated monoglycerides,

(b) about 2 to about 10 parts by weight of a liquid, polyglyceryl ester of HLB of at least 8,

(c) about 1 to about 6 parts by weight of colloidal silicon dioxide,

(ii) about 0.5 to about 5.0 parts by weight of a material soluble or dispersible in (i) selected from the group consisting of lecithin and the water soluble pharmaceutically acceptable salts of alginic acid and capable of being insolubilized by a pharmaceutically acceptable polyvalent cation,

(iii) about 5 to about 20 parts by weight of a solid pharmaceutically acceptable salt containing the cation required in (ii) to a total of 100 parts by weight.

4,988,680

PHOSPHONOALKYLPURINE DERIVATIVES

Serge J. Halazy, Wolfisheim, and Charles Danzin, Strasbourg, both of France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

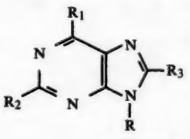
Filed Apr. 14, 1989, Ser. No. 338,781

Claims priority, application European Pat. Off., Apr. 19, 1988, 88400948.1

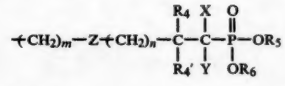
Int. Cl.[5] A61K *31/675;* C07F *9/6524*

U.S. Cl. 514—81 31 Claims

1. A compound of the formula



wherein R is sa phosphoroalkyl group of the formula:



wherein

m and n are each an integer of from 1 to 5 with the proviso that m+n must be an interger of from 2 to 6;

Z is an oxy group or a methylene group;

R_4 is a hydrogen and R_4' is a hydrogen or hydroxy group or R_4 and R_4' taken together with the carbon atom to which they are attached form a keto group;

X and Y are each a hydrogen, fluoro or chloro group with the proviso that both of X and Y cannot be hydrogen;

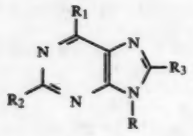
R_5 and R_6 are each a hydrogen or a (C_1-C_4)alkyl group;

R_1 *pl is a hydroxy or sulfhydryl group;*

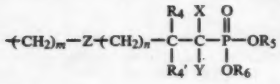
R_2 is a hydrogen or amino group; and

R_3 is a hydrogen, amino, hydroxy or —NH—NH_2 group; or a pharmaceutically acceptable salt thereof.

12. A method of suppressing the immune system in a patient in need thereof which comprises administering to the patient an effective amount of a compound of the formula



wherein R is a phosphonoalkyl group of the formula:



wherein

m and n are each an integer of from 1 to 5 with the proviso that m+n must be an integer of from 2 to 6;

Z is an oxy group or a methylene group;

R_4 is a hydrogen and R_4' is a hydrogen or hydroxy group or R_4 and R_4' taken together with the carbon atom to which they are attached form a keto group;

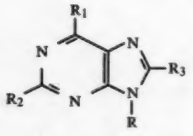
X and Y are each a hydrogen, fluoro or chloro group with the proviso that both of X and Y cannot be hydrogen;

R_1 is a hydroxy or sulfhydryl group;

R_2 is a hydrogen or amino group; and

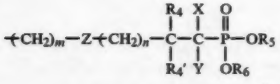
R_3 is a hydrogen, amino, hydroxy or —NH—NH_2 group; or a pharmaceutically acceptable salt thereof.

23. A method of inhibiting purine nucleoside phosphorylase in a patient in need thereof which comprises administering to the patient an effective amount of a compound of the formula:



1

wherein R is a phosphonoalkyl group of the formula



wherein m and n are each an integer of from 1 to 5 with the proviso that m+n must be an integer of from 2 to 6;

Z is an oxy group or a methylene group;

R_4 is a hydrogen and R_4' is a hydrogen or hydroxy group or R_4 and R_4' taken together with the carbon atom to which they are attached form a keto group;

X and Y are each a hydrogen, fluoro or chloro group with the proviso that both of X and Y cannot be hydrogen;

R_5 and R_6 are each a hydrogen or (C_1—C_4)alkyl group;

R_1 is a hydroxy or sulfhydryl group;

R_2 is a hydrogen or amino group; and

R_3 is a hydrogen, amino, hydroxy or—NH—NH_2 group; or a pharmaceutically acceptable salt thereof.

4,988,681

PHOSPHINIC ACID DERIVATIVES

Kiyofumi Ishikawa, Chofu; Takehiro Fukami, Ichikawa; Hiroshi Naganuma, Hachioji, and Kyoko Nakamichi, Tokyo, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan

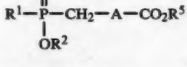
Filed Jun. 22, 1989, Ser. No. 370,190

Claims priority, application Japan, Jun. 23, 1988, 63-155830

Int. Cl.[5] A61K *31/66, 31/675;* **C07F** *9/30;* **C07C** *69/00*

U.S. Cl. 514—93 **13 Claims**

1. A phosphinic acid derivative of formula (I) or a pharmaceutically acceptable salt thereof,



(I)

in which

R^1 represents a linear or branched alkyl group having 1 to 10 carbon atoms which may be substituted by a hydroxyl group, a lower alkoxy-lower alkyloxy group or a halogen atom; a cycloalkyl-lower alkyl group having 4 to 10 carbon atoms; a cycloalkyl group having 3 to 6 carbon atoms in the ring which may be substituted by 1 to 4 identical or different lower alkyl groups; or an aralkyl group having 7 to 11 carbon atoms;

R^2 represents a hydrogen atom;

R^5 represents a hydrogen atom, a 1-(lower alkylcarbonyloxy)lower alkyl group, a phthalidyl group, a lower alkoxycarbonylmethyl group or a 1-(5-lower alkyl or phenyl-2-oxo-1,3-dioxol-4-yl)lower alkyl group; and

A represents a group of the formula

wherein R^{3a} represents a phenyl group; an aralkyl group having 7 to 11 carbon atoms; a cycloalkyl-lower alkyl group having 4 to 10 carbon atoms; or a linear or branched alkyl group having 1 to 10 carbon atoms or a cycloalkyl group having 3 to 6 carbon atoms in the ring, which may be substituted by a halogen atom, a carboxyl group, a di-lower alkyl-substituted amino group, an N-methyl-N-carboxymethylamino group, a phenylthio group, a triazolylthio group, a carboxy-lower alkylthio group, a lower alkoxycarbonyl-lower alkylthio group, a pyridylthio group, hydroxy substituted pyridylthio group, an imidazolylthio group, a lower alkyl substituted imidazolylthio group, a hydroxy-lower-alkylthio group, an amino-lower alkylthio group or a 2-amino-2-carboxyethylthio group; and the double bond at A has a Z-configuration, or a group of the formula

wherein R^{4a} represents a cycloalkyl group having 3 to 6 carbon atoms.

7. A pharmaceutical composition comprising an effective amount of a phosphinic acid derivative of general formula [I] or its pharmaceutically acceptable salt according to claim 1 and an adjuvant.

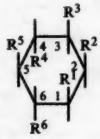
4,988,682

MYO-INOSITOL ANALOGS AND METHOD FOR THEIR USE

Alan P. Kozikowski, Porte Verda Beach, Fla., assignor to University of Pittsburgh, Pittsburgh, Pa.

Filed Feb. 3, 1989, Ser. No. 306,728
Int. Cl.[5] A61K *31/655*
U.S. Cl. 514—150 16 Claims

1. A compound represented by the general formula II:



II

wherein:

R^1, R^2, R^3, R^4, R^5 and R^6 is each independently selected from the group consisting of OH, F, N_3, NH_2, SH, SeH, Cl Br, I and CN; with the proviso:

(i) four or five of said R^1, R^2, R^3, R^4, R^5 and R^6 are OH;

(ii) if one of said R^1, R^2, R^3, R^4, R^5 and R^6 is N_3, then one of said R^1, R^2, R^3, R^4, R^5 and R^6 is selected from the group consisting of F, NH_2, SH, SeH, Cl, Br, I and CN;

(iii) if one of said R^1, R^12, R^3, R^4, R^5 and R^6 is NH_2, then one of said R^1, R^2, R^3, R^4, R^5 and R^6 is selected from the group consisting of F, N_3, SH, SeH, Cl, Br, I and CN; and

(iv) if said R^4, R^5 or R^6 is F, Cl, Br or I then four of said R^1, R^2, R^3, R^4, R^5 and R^6 are OH.

4,988,683

NEW PHARMACEUTICAL COMPOSITIONS FOR THE BUCCAL TRACT AND PROCESS FOR THEIR PREPARATION

Jerome Corbiere, 17 Rue Corbiere, 75016 Paris, France

Filed Jul. 20, 1989, Ser. No. 383,027
Claims priority, application France, Mar. 4, 1987, 87 02939
Int. Cl.[5] A61K *9/20, 9/68, 31/60*
U.S. Cl. 514—165 8 Claims

1. A method of treating pain and hyperthermia in patients comprising administering buccally an amount of lysine acetylsalicylate sufficient to treat pain and hyperthermia.

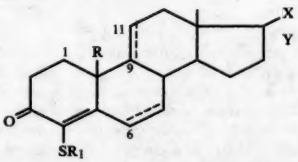
4,988,684

NOVEL 4-ALKYLTHIO-STEROIDS

Jean-Francois Gourvest, Joinville Le Pont; Dominique Lesuisse, Paris; Daniel Philibert, La Varenne Saint Hilaire, and Jean P. Vevert, Pantin, all of France, assignors to Roussel Uclaf, Paris, France

Filed Dec. 21, 1989, Ser. No. 454,697
Claims priority, application France, Dec. 22, 1988, 88 16993
Int. Cl.[5] A61K *31/565, 31/56;* C07J *1/00, 31/00*
U.S. Cl. 514—177 12 Claims

1. A compound of the formula



(I)

wherein R is selected from the group consisting of alkyl of 1 to 4 carbon atoms and alkenyl and alkynyl of 2 to 4 carbon atoms, R_1 is alkyl of 1 to 6 carbon atoms substituted with at least one member of the group consisting of alkoxy and alkylthio of 1 to 4 carbon atoms, $—NO_2$, —CN and halogen, X and Y together are =O or Y is hydrogen and X is —OH, etherified —OH or esterified —OH, the dotted lnes in the 1(2), 6(7) and 9(11) positions indicate a possible double bond.

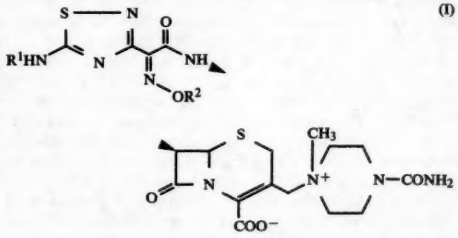
4,988,685

CEPHALOSPORINS DERIVATIVES

Jürgen Dornhagen, Eimeldingen; Rolf Angerbauer; Karl G. Metzger, both of Wuppertal, and Hans-Joachim Zeiler, Velbert, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 170,523, Mar. 18, 1988, abandoned.
This application Jan. 11, 1990, Ser. No. 464,662
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711343
Int. Cl.[5] C07D *501/56;* A61K *31/545*
U.S. Cl. 514—202 14 Claims

1. A cephalosporin derivative of the formula



(I)

in which

R^1 represents hydrogen or an amino-protecting group 4-methoxyphenyl, 4-methoxymethyloxyphenyl, 4-[(2-methoxyethoxy) methyloxy]phenyl, 3,4-dimethoxyphenyl, benzyl, 2-nitrobenzyl, 4-nitrobenzyl, 4-methoxybenzyl, 2,4-dimethoxybenzyl, 3,4-dimethoxybenzyl, 2,4,6-trimethoxybenzyl, vinyl, allyl, tert-butoxycarbonyl, benzyloxycarbonyl, 2-nitrobenzyloxycarbonyl, 4-nitrobenzyloxycarbonyl, formyl, acetyl, chloroacetyl trichloroacetyl, trifluoroacetyl, benzoyl, methoxycarbonyl, allyloxycarbonyl, 2,4dimethoxybenzyloxycarbonyl, 2,2-diethoxyethyl, methoxycarbonylmethyl, tert-butoxycarbonylmethyl, allyloxymethyl, benzoylmethyl, bis-(4-methoxyphenyl)methyl, methoxymethyl, methylthiomethyl, methoxyethoxymethyl, 2-(methylthiomethyoxy)ethoxycarbonyl, 2hydroxy-2-phenylmethylmethoxy-(4-methoxyphenyl)methyl, trimethyl-, triethy and triphenylsilyl, tert-butyl-dimethylsilyl, tert-butyl-diphenylsilyl and [2-(trimethylsilyl)ethoxy]-methyl

and

R^2 represents alkyl, of 1 to 12 carbon atoms cycloalkyl of up to 12 carbon atoms or alkenyl of 2 to 12 carbon atoms.

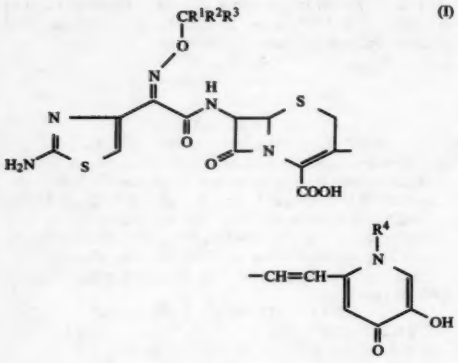
4,988,686

CEPHEM COMPOUNDS AND ANTI-BACTERIAL AGENT

Kunio Atsumi; Katsuyoshi Iwamatsu; Kenji Sakagami; Hiroko Ogino, and Takashi Yoshida, all of Yokohama, Japan, assignors to Meiji Seika Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 373,176
Claims priority, application Japan, Jul. 1, 1988, 63-164165
Int. Cl.[5] C07D *501/24;* A61K *31/545*
U.S. Cl. 514—203 2 Claims

1. A cephem compound which is either one of a cis- or trans-isomer or a mixture of the cis- and transisomers, represented by the following formula (I):



(I)

wherein R^1 represents a hydrogen atom, a carboxy group or an N-lower alkylcarbamoyl group, R^2 and R^3 may be the same or different and independently represent a hydrogen atom or a C_1–C_3 lower alkyl group, R^4 represents a hydrogen atom, a hydroxy group, a straight chain or branched C_1–C_4 lower alkoxy group, a substituted or unsubstituted straight or branched chain C_1–C_4 lower alkoxy group, a substituted straight or branched chain C_1–C_4 lower alkoxy group having a substituent selected from the group consisting of a hydroxy group, a lower alkoxy group, an amino group, a mono- or di-lower-alkyl-substituted amino group, an acyl group, a lower alkoxycarbonyl group, a carboxy group, a carbamoyl group, an N-lower alkyl substituted carbamoyl group, an N,N-di lower alkyl substituted carbamoyl group, a cyano group, a halogen atom, a nitro group, a sulfo group, a sulfonamido group, a mercapto group, an alkylthio group, an alkylsulfonyl group and an alkylsulfinyl group, a C_3–C_6 cycloalkyl group, a C_2–C_4 alkenyl or alkynyl group, a phenylmethyl group or heterocyclylmethyl group, a substituted phenylmethyl group having a substituent selected from the group consisting of a hydroxy group, a lower alkoxy group and an alkoxy-substituted benzyloxy group, and a heterocyclic ring of the heterocyclylmethyl group being a 2-furyl group, 4-pyridyl group, 1-methyl-4-pyridinyl group, 2-thienyl group, 1H-tetrazol-5-yl group, 1-methyl-1H-tetrazol-5-yl group, 4-methylthiazol-5-yl group, triazolyl group, thadiazolyl group, imidazolyl group or oxazolyl group, and a pharmacologically acceptable salt thereof.

4,988,687

CEPHALOSPORIN DERIVATIVES, AND ANTIBACTERIAL AGENTS

Susumu Nakagawa; Ryuji Mitomo, and Ryosuke Ushijima, all of Okazaki, Japan, assignors to Banyu Pharmaceutical Company, Ltd., Tokyo, Japan

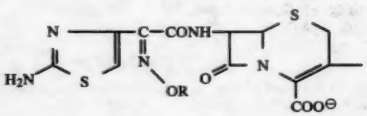
Continuation of Ser 28,576, March 20, 1987. This application filed Sep. 1, 1989, Ser. No. 401,747

Claims priority, application Japan, Mar. 20, 1986, 60-500

Int. Cl.[5] C07D *501/36;* **A61K** *31/545*

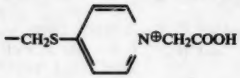
U.S. Cl. 514—206 **6 Claims**

1. A compound having the formula



(I)

-continued



wherein R is a 1-carboxy-1-vinyl group; or a pharmaceutically acceptable salt, physiologically hydrolyzable ester or solvate thereof.

4,988,688

4-(N-SUBSTITUTED AMINO)-2-BUTYNYL-1-UREAS AND THIOUREAS AND DERIVATIVES THEREOF AS CENTRALLY ACTING MUSCARINIC AGENTS

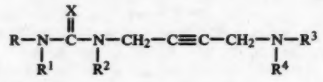
Jeffrey A. Kester; Walter H. Moos, and Anthony J. Thomas, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 2, 1989, Ser. No. 388,785

Int. Cl.[5] C07C *275/20;* **A61K** *31/17;* **C07D** *245/145*

U.S. Cl. 514—212 **15 Claims**

1. A compound of Formula I



I

wherein X is oxygen

R is hydrogen and R^1 is hydrogen,

alkyl of from one to six carbon atoms,

alkyl of from one to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkenyl of from three to six carbon atoms,

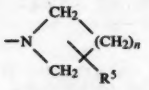
alkenyl of from three to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkynyl of from three to six carbon atoms,

alkynyl of from three to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

cycloalkyl of from three to six carbon atoms, or

R and R^1 are taken together with the nitrogen atom to which they are attached to form a ring denoted by



wherein n is zero or an integer from one to eight and R^5 is hydrogen, alkyl of from one to ten carbon atoms, alkyl of from one to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkenyl of from two to ten carbon atoms, alkenyl of from two to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkynyl of from two to ten carbon atoms or alkynyl of from two to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms;

R^2 is hydrogen,

alkyl of from one to six carbon atoms,

alkyl of form one to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkenyl of from three to six carbon atoms,

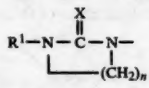
alkenyl of from three to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkynyl of from three to six carbon atoms,

alkynyl of from three to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

cycloalkyl of from three to six carbon atoms, or

R^2 when taken together with R forms a ring denoted by



wherein n is an integer from one to three and X and R^1 are as defined above;

R^3 and R^4 are each independently

hydrogen,

alkyl of from one to twenty carbon atoms,

alkyl of from one to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkenyl of from three to twenty carbon atoms,

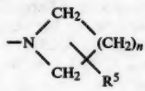
alkenyl of from three to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

alkynyl of from three to twenty carbon atoms,

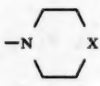
alkynyl of from three to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,

cycloalkyl of from three to eight carbon atoms, phenyl,

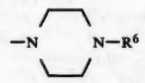
phenyl substituted with alkyl of from one to four carbon atoms, alkyl of from one to four carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkoxy of from one to four carbon atoms, chlorine, bromine, hydroxy, nitro or trifluoromethyl or R^3 and R^4 are taken together with the nitrogen atom to which they are attached to form a ring denoted by



wherein n and R^5 are as defined above,



wherein X is as defined above or



wherein R^6 is hydrogen or alkyl of from one to six carbon atoms,

or a pharmaceutically acceptable acid addition salt thereof.

4,988,689

((PHARMACOLOGICALLY ACTIVE BICYCLIC HETEROCYCLIC)METHYL AND -HETEROATOM) SUBSTITUTED HEXAHYDRO-1H-AZEPINES AND PYRROLIDINES

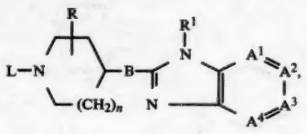
Frans E. Janssens, Bonheiden; Gaston S. M. Diels, Ravels, and Geert M. E. Pille, Edegem, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation of Ser. No. 198,960, May 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 68,515, Jul. 1, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,440

Int. Cl.[5] A61K *31/55, 31/44;* **C07D** *471/04, 401/12*

U.S. Cl. 514—212 **14 Claims**

1. A compound of the formula:



(I)

a pharmaceutically acceptable acid addition salt or a stereochemically isomeric form thereof, wherein:

$—A^1=A^2—A^3=A^4—$ represents a bivalent radical of the formula:

—CH=CH—CH=CH—,	(a-1)
—N=CH—CH=CH—,	(a-2)
—CH=N—CH=CH—,	(a-3)
—CH=CH—N=CH—,	(a-4)
—CH=CH—CH=N—,	(a-5)
—N=CH—N=CH—, or	(a-6)
—CH=N—CH=N—,	(a-7)

wherein one or two hydrogen atoms in said radicals (a-1)–(a-7) may, each independently from each other, be replaced by halo, C_{1-6}alkyl, C_{1-6}alkyloxy, trifluoromethyl, or hydroxy;

R^1 represents hydrogen, C_{1-10}alkyl, C_{3-6}cycloalkyl, Ar^1 or C_{1-6}alkyl substituted with one or two Ar^1 radicals;

B represents NR^2, CH_2, O, S, SO, or SO_2, wherein R^2 represents hydrogen, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkylcarbonyl, C_{1-6}alkyloxycarbonyl, or Ar^2-C_{1-6}alkyl;

R represents hydrogen or C_{1-6}alkyl;

n represents 0 or 2; and

L represents hydrogen, C_{3-6}cycloalkyl, C_{2-6}alkenyl optionally substituted with Ar^2, or C_{1-12}alkyl,

wherein in the foregoing:

Ar^1 represents a member selected from the group consisting of phenyl which may optionally be substituted with 1, 2, or 3 substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, C_{1-6}alkyl, C_{1-6}alkyloxy, C_{1-6}alkylthio, mercapto, amino, mono- and di(C_{1-6}alkyl)amino, carboxyl, C_{1-6}alkyloxycarbonyl, and C_{1-6}alkylcarbonyl; thienyl; halothienyl; furanyl; C_{1-6}alkyl substituted furanyl; pyridinyl; pyrimidinyl; pyrazinyl; thiazolyl; and imidazolyl optionally substituted with C_{1-6}alkyl; and

Ar^2 represents a member selected from the group consisting of phenyl which may optionally be substituted with 1, 2, or 3 substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, C_{1-6}alkyl, C_{1-6}alkyloxy, C_{1-6}alkylthio, mercapto, amino, mono- and di(C_{1-6}alkyl)amino, carboxyl, C_{1-6}alkyloxycarbonyl, and C_{1-6}alkylcarbonyl.

4,988,690

1-ARYLOXY-2,3,4,5-TETRAHYDRO-3-BENZAZEPINES AND ANTI-DEPRESSANT USE THEREOF

Richard C. Effland; Joseph T. Klein, both of Bridgewater, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

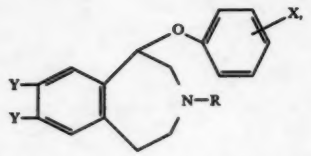
Filed Jun. 14, 1982, Ser. No. 387,916

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

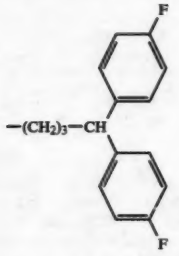
Int. Cl.[5] C07D *223/16;* **A61K** *31/55*

U.S. Cl. 514—213 **142 Claims**

1. A compound having the formula

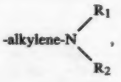


different and is hydrogen and lower alkoxy; X is hydrogen, halogen, lower alkyl, lower alkoxy, CF_3NO_2 and NH_2; R is hydrogen, lower alkyl, cycloalkyl lower alkyl,



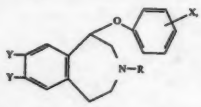
Ar lower alkyl of the formula -alkylene

, where Z is hydrogen, lower alkyl, lower alkoxy, CF_3, NO_2 and NH_2; and an alkylene amine of the formula -alkylene-

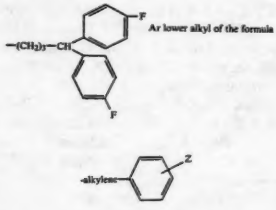


, where R^1 and R_2 are the same or different and are hydrogen and lower alkyl; and the pharmaceutically acceptable acid addition salts thereof.

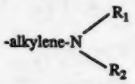
140. A method of reducing depression in a patient in need thereof which comprises administering to a patient an effective antidepressant amount of a compound of the formula



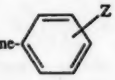
wherein Y is the same or different and is hydrogen and lower alkoxy; X is hydrogen, halogen, lower alkyl, lower alkoxy, CF_3, CN, NO_2 and NH_2; R is hydrogen, lower alkyl, cycloalkyl lower



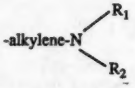
where Z is hydrogen, lower alkyl, lower alkoxy, CF_3, NO_2 and NH_2; and an alkylene amine of the formula



, where R^1 and R_2 are the same or different and are hydrogen and lower alkyl; and the acceptable acid addition salts thereof.

[. Ar lower alkyl of the formula 

, where Z is hydrogen, lower alkyl, lower alkoxy, halogen, CF_3, NO_2 and NH_2 and an alkylene amine of the formula



, where R_1 and R_2 are the same or different and are hydrogen and lower alkyl] and the pharmaceutically acceptable acid addition salts thereof.

4,988,691

ISOXAZOLE CONTAINING COMPOUNDS EXHIBITING ANTI-SEROTONIN ACTIVITY

Giancarlo Benelli, Milan; Angelo Carenzi, Busto Arsizio; Dario Chiarino, Monza, and Mario Fantucci, Milan, all of Italy, assignors to Zambon Group S.p.A., Vicenza, Italy

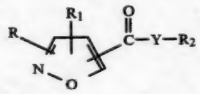
Filed Jan. 8, 1990, Ser. No. 461,807

Claims priority, application Italy, Jan. 9, 1989, 19029 A/89

Int. Cl.[5] A61K *31/46;* **C07D** *451/12, 451/04*

U.S. Cl. 514—214 **4 Claims**

1. A compound of formula

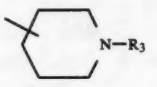

(I)

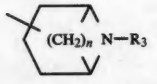
wherein

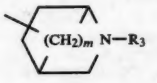
R and R_1, equal to or different from each other, represent a hydrogen atom, a C_1–C_3 alkyl, a halogen atom, a C_1–C_3 alkoxy optionally substituted with a phenyl or a phenyl optionally substituted with from 1 to 3 substituents selected from C_1–C_3 alkyls, halogens, C_1–C_3 alkoxy groups;

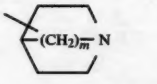
Y represents an oxygen atom or a NH group;

R_2 represents a group selected from

(A) 

(B) 

(C) 

(D) 

wherein

R_3 represents a C_1–C_3 alkyl;

n represents an integer selected from 2 and 3 and

m represents an integer selected from 1, 2 and 3; and salts thereof with pharmaceutically acceptable organic or inorganic acids.

4,988,692

2,4-DIOXO-5-PHENYL-2,3,4,5-TETRAHYDRO-1H-1,5-BENZODIAZEPINES

Jean-Claude Gasc, Bondy, and Daniel Humbert, Fontenay sous Bois, both of France, assignors to Roussel Uclaf, Paris, France

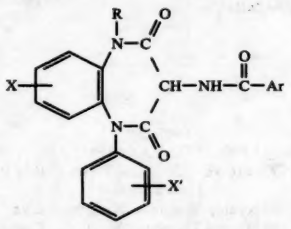
Filed Dec. 27, 1989, Ser. No. 457,237

Claims priority, application France, Dec. 29, 1985, 88-17395

Int. Cl.[5] C07D *243/12;* A61K *31/55*

U.S. Cl. 514—221 **24 Claims**

1. A compound in all possible isomeric forms and mixtures thereof of the formula



(I)

wherein X and X' are individually selected from the group consisting of hydrogen, halogen, cyano $—NO_2$, $—CF_3$ and alkyl and alkoxy of 1 to 8 carbon atoms, R is hydrogen or alkyl of 1 to 8 carbon atoms and Ar is selected from the group consisting of phenyl optionally substituted by at least one substituent selected from the group consisting of halogen, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 8 carbon atoms, pyridinyl, thiophenyl, oxazolyl or isoxazolyl, indolyl, benzofuranyl and quinolinyl.

9. A cholecystokinine antagonistic composition comprising a cholecystokinine antagonistically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

4,988,693

FUNGICIDE COMPOSITIONS

Tamás Detre, Nagymaros; Lajos Rejto, Budapest; József Sós, Budapest; András Szego, Budapest; Ferenc Virányi, Budapest; Tibor Érsek, Budapest; Gyöngyvér Nagy née Hegyi, Budapest; László Hornok, Budapest; Attila Molnár, Pásztó ; Erzsébet Schüszler, Budapest; Sándor Ángyán, Budapest; Katalin Mármarosi, née Kellner, Biatorbágy; Lyr Horst, Eberswalde; Dieter Zanke, Potsdam; Brita Lenner, Kleinmachnow; Marlies Strump, Potsdam, and Gyula Oros, Budapest, all of Hungary, assignors to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara, R. T., Budapest, Hungary

PCT No. PCT/HU88/00013, § 371 Date Dec. 5, 1988, § 102(e) Date Dec. 5, 1988, PCT Pub. No. WO88/06841, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 8, 1988, Ser. No. 290,108

Claims priority, application Hungary, Mar. 9, 1987, 983/87

Int. Cl.[5] A01N *37/12, 37/44, 43/52, 43/84*

U.S. Cl. 514—231.2 **4 Claims**

1. A synergistic fungicidal composition containing as active ingredients a synergistically effective mixture of:

(A) methyl-N-phenylacetyl-N-(2,6-xylyl)-D,L-alaninate;

(B) 2,6-dimethyl-4-tridecylmorpholine; and

(C) one of the following fungicides:

methyl-benzimidazole-2-yl-carbamate; or

methyl-1-(butylcarbamoyl)benzimidazole-2-yl-carbamate;

wherein the weight ratio of the Compound (A), Compound (B) and Compound (C) is 1:3 to 5:1 to 6.

4,988,694

4-BROMO-6-CHLORO-5-AMINO-2-PYRIDYL-ETHANOLAMINES AND THEIR USE AS YIELD PROMOTERS

Hans Lindel, Leverkusen; Werner Hallenbach, Langenfeld; Friedrich Berschauer, Wuppertal; Gernot Klotz, Leichligen, and Heinrich A. Greife, Langenfeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

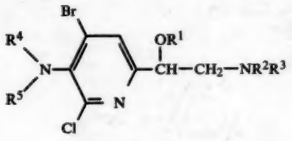
Filed Apr. 20, 1989, Ser. No. 340,936

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 3813839

Int. Cl.[5] C07D *213/74, 405/06, 401/06;* A61K *31/44*

U.S. Cl. 514—235.5 **5 Claims**

1. A 4-bromo-6-chloro-5-amino-2-pyridyl-ethanolamine of the formula



in which,

R^1 stands for hydrogen or C_{1-6}-alkyl, or for carbonyl-C_{1-6}-alkyl, optionally substituted carbonylphenyl, sulphonyl-C_{1-6}-alkyl or optionally substituted sulphonylphenyl; or for tris-(C_1-C_{12}-alkyl)-silyl or diphenyl-C_{1-6}-alkylsilyl,

R^2 stands for hydrogen or C_{1-6}-alkyl,

R^3 stands for hydrogen, optionally substituted branched C_{3-6}-alkyl, C_{3-6}-cycloalkyl or C_{1-6}-alkylphenyl, or

R^2 and R^3, together with the nitrogen atom to which they are bonded, can stand for optionally substituted piperazinyl, morpholinyl, piperidinyl, and pyrrolidinyl,

R^4 stands for hydrogen or C_{1-6}-alkyl and

R^5 stands for hydrogen, C_{1-6}-alkyl, C_{1-4}-halogenoalkyl, C_{1-6}-alkylcarbonyl, optionally substituted benzoyl, C_{1-6}-alkylsulphonyl or optionally substituted phenylsulphonyl, wherein the possible substituents of the optionally substituted R^1, R^3, R^2 and R^3, together with the nitrogen atom to which they are bonded and R^5 radicals are:

cyano, halogen, hydroxyl, C_{1-4}-alkyl, C_{1-4}-halogenoalkyl, phenyl, C_{1-4}-alkoxy, C_{1-4}-halogenoalkoxy, C_{1-4}-alkylthio and C_{1-4}-halogenoalkylthio, and in the case where the substituents are on a phenyl radical, also methylenedioxy, ethylenedioxy, halogensubstituted methylenedioxy, and halogensubstituted ethylenedioxy, phenyl and phenoxy, or phenyl or phenoxy, which are substituted by cyano, halogen, hydroxyl, C_{1-4}-alkyl, C_{1-4}-halogenoalkyl, phenyl, C_{1-4}-alkoxy, C_{1-4}-halogenoalkoxy, C_{1-4}-alkylthio, C_{1-4}-halogenoalkylthio, methylenedioxy, ethylenedioxy, halogen-substituted methylenedioxy, halogen-substituted ethylenedioxy, and phenoxy.

5. A yield-promoting composition for animals comprising a yield promoting effective amount of a 2-pyridyl-ethanolamine according to claim 1 and an acceptable carrier.

4,988,695

PYRROLOCINNOLINES FOR USE AS INHIBITORS OF GASTRIC ACID SECRETION

Thomas H. Brown, Tewin, and Peter Blurton, Welwyn Garden City, both of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, United Kingdom

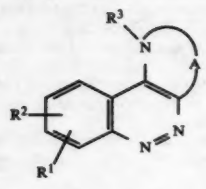
Filed Jan. 23, 1990, Ser. No. 468,523

Claims priority, application United Kingdom, Jan. 23, 1989, 8901430.2

Int. Cl.[5] C07D *487/04;* A61K *31/50*

U.S. Cl. 514—248 **14 Claims**

1. A compound of structure (I)

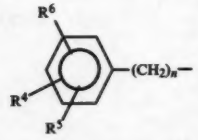


(I)

in which

R^1 and R^2 are the same or different and are each hydrogen, C_{1-6}alkyl, C_{1-6}alkoxy, phenyl, C_{1-6}alkylthio, C_{1-6}alkanoyl, amino, C_{1-6}alkylamino, diC_{1-6}alkylamino, halogen or trifluoromethyl;

R^3 is hydrogen, C_{1-6} or a group



R^4 to R^6 are the same or different and are each hydrogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkylthio, halogen, cyano, amino, hydroxy, carbamoyl, carboxy, C_{1-6}alkanoyl or trifluoromethyl;

n is 0 to 4; and

A is $-(CH_2)_2-$, $-(CH_2)_3-$ or $-CH=CH-$; or a pharmaceutically acceptable salt thereof.

4,988,696

DERMAL TREATMENT OF WORM DISEASES IN CATS WITH PRAZIQUANTEL

Peter Andrews, Wuppertal, and Herbert Voege, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 101,899, Sep. 28, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,202

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1986, 3634755

Int. Cl.[5] A61K *31/495, 31/50*

U.S. Cl. 514—250 4 Claims

1. A method of treating a worm disease in a cat which comprises dermally applying to the cat 0.1–5 mg of praziquantel per kg of body weight, the praziquantel being dissolved, suspended or emulsified in a skin-tolerate solvent selected from the group consisting of N-methylpyrrolidone, isopropyl myristate and mixtures thereof in a concentration of about 0.1 to 20 per cent by weight.

4,988,697

FUNGICIDAL COMPOSITIONS AND METHOD

Janet C. Onishi, Mountainside, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 28, 1989, Ser. No. 386,320

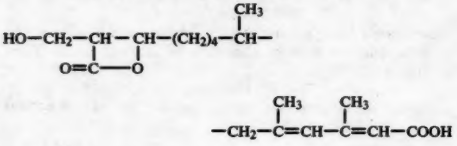
Int. Cl.[5] A61K *31/495, 31/50, 31/41, 31/335, 31/415*

U.S. Cl. 514—252 15 Claims

1. A synergistic antifungal composition suitable for treating mycotic infections in unit dosage form comprising a mycotic infection controlling amount in combination of:

(1) from about 200 to 400 milligrams of a 14α-methyldemethylase inhibiting azole compound selected from the group consisting of (a) cis-1-acetyl-4-[4-[[2-(2,4-dichlorophenyl)-2-(1H-imidazol-1-yl-methyl)-1,3-dioxolan-4-yl]-methoxyl]phenyl]piperazine (ketoconazole), (b) α-(2,4-difluorophenyl)-α-(1H-1,2,4-triazol-1-yl-methyl)-1H-1,2-4-triazol-1-ethanol (fluconazole), (c) cis-4-[4-[4-[[2-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-4-yl]-methoxy]-phenyl]1-piperazinyl]phenyl-2,4-dihydro-2-(1-methylpropyl)-3H-1,2,4-triazol-3-one (itraconazole) and (d) 1-[2,4-dichloro-β-(2,4-dichlorobenzyloxy)-phenethyl]imidazole nitrate (miconazole); and

(2) from about 200 to 400 milligrams of a β-lactone compound having the formula



or a salt thereof

wherein said compounds are in admixture with a pharmaceutically acceptable carrier.

4,988,698

2(1H)-QUINOLINONE COMPOUNDS AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME

Masayuki Kato, Kyoto; Shigetaka Nishino, Osaka; Kiyotaka Ito, Ikeda, and Hisashi Takasugi, Osaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

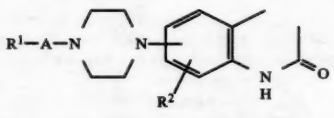
Filed Nov. 13, 1989, Ser. No. 434,256

Claims priority, application United Kingdom, Nov. 21, 1988, 8827189

Int. Cl.[5] A61K *31/495;* C07D *521/00*

U.S. Cl. 514—284 6 Claims

1. A compound of the formula:



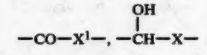
[I]

wherein

R^1 is imidazopyridyl, thiazolyl, indolyl, dihydroindolyl, imidazolyl, benzimidazolyl, quinolyl, isoquinolyl, quinazolinyl, dihydroisoquinolyl, tetrahydroimidazopyridyl or tetrahydroquinolyl, each of which may be substituted with substituent(s) selected from the group consisting of lower alkyl, halogen, lower alkoxy, lower alkylthio, ar(lower)alkoxy, cyano, nitro, amino, lower alkylamino, acylamino, hydroxy and oxo,

R^2 is hydrogen, lower alkyl or halogen,

A is a single bond or a group of the formula selected from the group consisting of:



and —X—CO—, in which

X is a single bond or lower alkylene and

X^1 is lower alkylene, and

a heavy solid line means a single or a double bond,

and its pharmaceutically acceptable salt.

6. A method for therapeutic treatment of heart disease or hypertension which comprises administering an effective amount of a compound of claim 1 to human beings or animals.

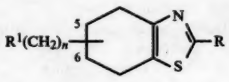
4,988,699

SUBSTITUTED TETRAHYDROBENZOTHIAZOLES AS DOPAMINERGIC AGENTS

Bradley W. Caprathe, Redford; Juan C. Jaen, Plymouth, and Lawrence D. Wise, Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 14, 1989, Ser. No. 323,519
Int. Cl.[5] A61K *31/495;* C07D *417/14*
U.S. Cl. 514—254 6 Claims

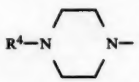
1. A compound of Formula I



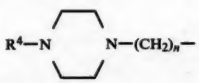
I

wherein R is hydrogen, lower alkyl or

wherein R^2 is hydrogen, lower alkyl, aryl lower alkyl, lower alkanoyl, aryl lower alkanoyl or aroyl and R^3 is hydrogen, lower alkyl or aryl lower alkyl; n is zero or an integer from 1 to 3; R^1 is



wherein R^4 is 2-, 3-, or 4-pyridinyl or 2-, 3-, or 4-pyridinyl substituted by lower alkyl, lower alkoxy or halogen and



is attached at the 5 or 6 position or the tetrahydrobenzothiazole ring; and corresponding optical isomers thereof; or a pharmaceutically acceptable acid addition salt thereof.

5. A method of treating schizophrenia comprising administering to a host suffering therefrom a therapeutic effective amount of a compound according to claim 1 in unit dosage form.

4,988,700

MEDICAMENTS FOR THE TREATMENT OF CEREBRAL APOPLEXY

Jörg Traber, Lohmar, and Gerhard-Wilhelm Bielenberg, Amoeneburg, both of Fed. Rep. of Germany, assignors to Troponwerke GmbH & Co., Cologne, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,161
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831888
Int. Cl.[5] A61K *31/495*
U.S. Cl. 514—255 6 Claims

1. A method of treating cerebral apoplexy in a patient in need thereof which comprises adminstering to said patient an amount effective therefor of a serotonin agonist which is an aryl- or hetaryl-piperazine and has a binding strength of less than 10,000 nmol/l on binding to $5HT_{1A}$ receptors.

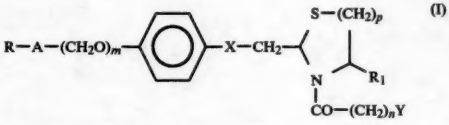
4,988,701

CYCLIC AMINO-THIOACETAL AMIDES, A PROCESS FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS

Roberto Di Domenico; Carmelo A. Gandolfi; Silvano Spinelli; Bruno Lumachi; Odoardo Tofanetti, and Sergio Tognella, all of Milan, Italy, assignors to Boehringer Biochemia Robin S.p.A., Milan, Italy

Continuation of Ser. No. 214,345, Jul. 1, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 453,390
Claims priority, application Italy, Jul. 2, 1987, 21159 A/87
Int. Cl.[5] C07D *277/04, 277/06;* A61K *31/425*
U.S. Cl. 514—255 6 Claims

1. A compound of the formula



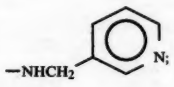
(I)

wherein R is CO_2Ra;

R_1 is H or CO_2Ra;

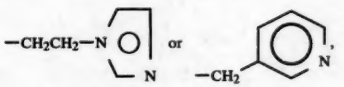
A is a single bond, cis or trans HC═CH, C═C, CH_2 *1 or* CH_2—CH_2;

Y is a substituent selected from the group consisting of —H_1—CO—Re, —CO_2Ra, —CONRbRc, imidazol-1-yl, 3-pyridyl, —$X_1(CH_2)$n—Rd; and



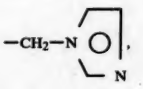
Ra is hydrogen or C_1–C_5 or straight or branched alkyl;

Rb and Rc are H, C_1–C_5 alkyl, 2-dimethylamino-ethyl, 2-diethylamino-ethyl,



or taken together with the nitrogen atom to which they are bound form a 4-(C_1–C_5-alkyl)piperazin-yl ring;

Rd is hydrogen, C_1–C_5 straight or branched alkyl,



3-pyridyl, CO_2Ra or CONRbRc;

Re is C_1–C_5 straight or a branched alkyl or phenyl;

X and X_1 are independently oxygen or sulfur;

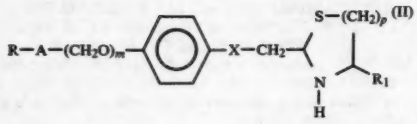
m is zero or 1;

n is an integer 1 to 7;

and p is 1; and

pharmaceutically acceptable acid or base addition salts thereof, enantiomers, racemates or diastereoisomers thereof, or mixtures thereof.

6. A compounds of the formula



wherein R is COORa;

R_1 is a H or COORa,

A is a single bond, cis or trans CH—CH, C≡C, CH_2H or CH_2CH_2;

Ra is hydrogen or C_1–C_5 straight or branched alkyl;

X is oxygen or sulfur;

m is zero or 1; and

p is 1.

4,988,702

NOVEL 9-DEAZAGUANINES

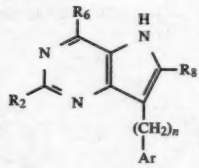
Catherine R. Kostlan, and Jagadish C. Sircar, both of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 336,585, Apr. 10, 1989, Pat. No. 4,923,872, which is a continuation of Ser. No. 117,352, Nov. 12, 1987, abandoned, which is a continuation-in-part of Ser. No. 59,419, Jun. 18, 1987, abandoned, which is a continuation-in-part of Ser. No. 900,486, Aug. 26, 1986, abandoned. This application Feb. 12, 1990, Ser. No. 478,610

Int. Cl.[5] A61K *31/505;* **C07D** *487/04*

U.S. Cl. 514—258 **1 Claim**

1. A method for treating autoimmune disease or rejection of transplantation in a human suffering from the disease or rejection of transplantation which comprises administering a compound of the formula



wherein R_6 is OH or SH; R_2 is hydrogen or NH_2; R_8 is hydrogen or NH_2; n is an integer of zero through four; and Ar is (i) phenyl unsubstituted or substituted by halogen, alkyl of from one to four carbon atoms, hydroxy, alkoxy of one to four carbon atoms, or trifluoromethyl, (ii) 2- or 3- thienyl, (iii) 2- or 3- furanyl; or a pharmaceutically acceptable acid or base addition salt thereof in unit dosage form.

4,988,703

CARBOCYCLIC NUCLEOSIDE ANALOGS WITH ANTIVIRAL ACTIVITY

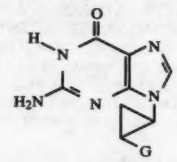
Daniel W. Norbeck, Lindenhurst, Ill.; Terry J. Rosen, East Lyme, Conn., and Hing L. Sham, Gurnee, Ill., assignors to Abbott Laboratories, Abbott Park, Ill.

Filed May 22, 1989, Ser. No. 355,594

Int. Cl.[5] A61K *31/52;* **C07D** *473/18, 473/30, 473/34*

U.S. Cl. 514—262 **5 Claims**

1. A compound of the formula:



wherein G is $—CH_2CH_2OH$ or $—CH(OH)CH_2$; or a pharmaceutically acceptable salt thereof.

4. A method of treating susceptible viral infections comprising administering to a human in need of such treatment an effective amount of a compound of claim 1.

5. A pharmaceutical composition comprising a pharmaceutical carrier and an effective amount of a compound of claim 1 for treating a susceptible viral infection.

4,988,704

PYRIMIDINE DERIVATIVE, PROCESS FOR PREPARING SAME AND ARGICULTURAL OR HORTICULTURAL FUNGICIDAL COMPOSITION CONTAINING SAME

Shigekazu Ito; Katsumi Masuda; Shoji Kusano; Toshihiro Nagata; Yoshiyuki Kojima; Nobumitsu Sawai, and Shin-ichiro Maeno, all of Shizuoka, Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of, Japan

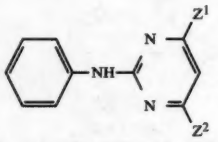
Continuation of Ser. No. 924,384, Oct. 29, 1986, Pat. No. 4,814,338. This application Mar. 20, 1989, Ser. No. 325,808

Claims priority, application Japan, Oct. 30, 1985, 60-243476; Jul. 29, 1986, 61-178354

Int. Cl.[5] A01N *43/54;* **C07D** *239/34*

U.S. Cl. 514—275 **7 Claims**

7. A method of protecting plants against agricultural or horticultural fungi, which comprises applying a fungicidally effective amount of a pyrimidine derivative represented by formula (I)



wherein Z^1 represents an alkenyl group, an alkoxy group, an alkenyloxy group, or an alkynyloxy group which may be substituted with a halogen atom, and Z^2 represents a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, or a group of the formula

where Z^3 represents a hydrogen atom or a methyl group; or an agricultural or horticultural fungicidally acceptable salt thereof.

4,988,705

POLYCYCLIC QUINOLINE, NAPHTHYRIDINE AND PYRAZINOPYRIDINE DERIVATIVES

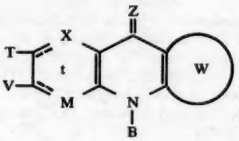
Ashit K. Ganguly, Upper Montclair; Richard J. Friary, West Orange; John H. Schwerdt, Lake Hiawatha; Marvin I. Siegel, Woodbridge; Sidney R. Smith, Ridgewood; Vera A. Seidl, Wayne, and Edmund J. Sybertz, South Orange, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 17,027, Feb. 17, 1987, Pat. No. 4,810,708, which is a continuation-in-part of Ser. No. 861,788, May 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 744,865, Jun. 13, 1985, abandoned. This application Feb. 7, 1989, Ser. No. 307,646

Int. Cl.[5] **A61K** *31/435, 31/47, 31/50, 31/505;* **C07D** *471/14, 471/22, 253/06, 403/14*

U.S. Cl. 514—282 **19 Claims**

1. A compound having the structural formula I



I

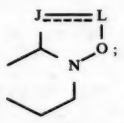
or a pharmaceutically acceptable salt or solvate thereof, wherein:

in formula I:

the dotted lines ( ) represent optional double bonds;

III

or

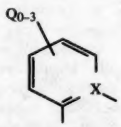


VII

T and V may be the same or different and each represents H, OH, alkyl, alkoxy, phenyl or substituted phenyl;

in addition, T may also be F, Cl, or Br;

X and M may be the same or different and each independently represents —CH(R^q)— or —NA— when the dotted line attached thereto does not represent a double bond; or X and M each independently represents =CH— or =N— when the dotted line attached thereto represents a double bond; or when M is N and the dotted lines in ring t both represent double bonds, X and T together with the carbon atom of the ring t therebetween may also represent a group



wherein X is a carbon atom and Q_{0-3} represents zero, 1, 2 or 3 Q substituents as defined below;

each A is independenly selected from H, alkyl, CH_2CH_2OH, COR^b, $COOR^e$, SO_2R^b or $(CH_2)_rR^c$;

Z is O, S, N—R^e or N(OR^i);

B is alkenyl, NH_2, $COOR^e$, O(CO)R^e, or an aryl group selected from phenyl, naphthyl, indenyl, indanyl, phenanthridinyl, pyridinyl, pyrimidinyl, pyrazinyl, 1,2,4-triazinyl, furanyl, thienyl, benzofuranyl, indolyl, imidazolyl, pyrazolyl, triazolyl, or thiazolyl, any of which aryl groups may be substituted with up to three of any of the following substituents, Q: halogen, hydroxy, nitro, alkyl, CH_2OH, trifluromethyl, cyano, N(R^f)$_2$, cycloalkyl, alkoxy, alkenyloxy, alkynyloxy, S(O)$_r$$R^e$, $NHSO_2R^e$, $NHSO_2CF_3$, $NHCOCF_3$, SO_2NH_2, SO_2NHR^e, $SO_2N(R^e)_2$, COR^h, O—D—COR^h, or $NHCOR^d$;

R^a is H, OH, alkyl, phenyl, substituted phenyl, phenylalkyl or substituted phenylalkyl;

R^b is H, alkyl, phenyl, substituted phenyl, or N(R^e)$_2$;

R^c represents carboxyl or N(R^f)$_2$;

R^d represents H, alkyl, alkoxy, COR^j or NHR^k;

each R^e independently represents alkyl, phenyl, substituted phenyl, benzyl or substituted benzyl;

each R^f independently represents H or alkyl;

R^h represents OH, NH_2 or OR^e;

each R^i independently represents H or alkyl;

R^j represents OH or alkoxy;

R^k represents H or alkyl;

D represents alkylene;

r is 0, 1 or 2; and

s is 1, 2, 3, 4 or 5;

in formula III:

the dotted line represents one optional double bond or two optional non-cumulated double bonds;

one of a, b, and c is N (if the dotted line attached thereto represents a double bond), N^+O^- (if the dotted line attached thereto represents a double bond), N—R^m or N—CO—R^n, d is CH (if the dotted line attached thereto represents a double bond) or CH_2, and each of the other two may be the same or different and each represents CH_2 or CH (if the dotted line attached thereto represents a double bond);

R^m represents H, alkyl, acyl, benzyl or substituted benzyl; and

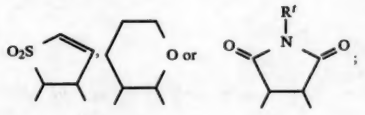
R^n represents phenyl, substituted phenyl, alkoxy, phenoxy, substituted phenoxy, phenylalkoxy, or substituted phenylalkoxy;

in formula VII:

one of J and L is CHR^q and the other is CR^rR^s or, when represents a double between J and L, one of J and L is CR^q and the other is CR^r;

R^q represents H, $COOR^f$, or alkyl;

R^r and R^s may be the same or different and each is selected from H, alkyl, acyl, —$COOR^e$, O(CO)R^e, —CN, phenylsulfonyl, substituted phenylsulfonyl, alkysulfonyl or nitro; or R^q and R^r together with the cabon atoms to which they are attached represent a carbocyclic ring having from 5 to 8 carbon atoms optionally containing one carbon-carbon double bond or represent a heterocyclic ring selected from



R^e is as defined above; and

R^f represents H, alkyl, phenyl, substituted phenyl, benzyl or substituted benzyl.

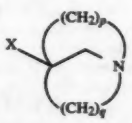
17. A method for treating allergic reactions, inflammation, peptic ulcers, hypertension or hyperproliferative skin disease in a mammal which comprises administering to said mammal an effective amount for such purpose of a compound of formula I as defined in claim **1**.

4,988,706
CERTAIN PHARMACEUTICALLY USEFUL OXADIAZOLES

Michael S. Hadley; Barry S. Orlek; Paul A. Wyman, and Harry J. Wadsworth, all of Harlow, England, assignors to Beecham Group P.L.C., Middlesex, England

Filed Apr. 13, 1989, Ser. No. 337,282
Claims priority, application United Kingdom, Apr. 15, 1988, 8808926
Int. Cl.[5] A61K *31/44*; C07D *471/08*
U.S. Cl. 514—299 **7 Claims**

1. A compound of formula (I) or a pharmaceutically acceptable salt thereof:



(I)

in which X represents a group

wherein one of Y and Z represents nitrogen and the other represents CR where R is selected from halogen, CN, OR^1, SR^1, $N(R^1)_2$, NHR^1, $NHCOR^1$, $NHCOOCH_3$, $NHCOOC_2H_5$, $NHNH_2$, COR^1, COR^2, C_{2-4} alkenyl, C_{2-4} alkynyl or C_{1-2} alkyl substituted with OR^1, $N(R^1)_2$, SR^1, CO_2R^1, $CON(R^1)_2$ or one or two halogen atoms, in which R^1 is hydrogen or C_{1-2} alkyl and R^2 is OR^1, NH_2 or NHR^1; and each of p and q independently represents an integer of 2 to 4.

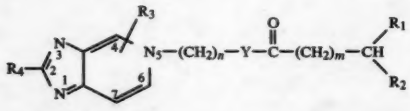
7. A method of treatment and/or prophylaxis of dementia in mammals including humans, which comprises administering to the sufferer an effective amount of a compound of formula (I) or a pharmaceutically acceptable salt thereof, as defined in claim 1.

4,988,707
PHARMACOLOGICALLY ACTIVE PHENYLALKANOYL SUBSTITUTED IMIDAZO (4,5-C) PYRIDINES

Michael A. Stealey, Libertyville, and Richard M. Weier, Lake Bluff, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Sep. 13, 1989, Ser. No. 406,638
Int. Cl.[5] A61K *31/44*; C07D *471/04*
U.S. Cl. 514—303 **16 Claims**

1. A compound of the formula



I

and isomers thereof;
or a pharmaceutically acceptable acid addition salt thereof: wherein

R_1 and R_2 are each independently selected from hydrogen; straight or branched chain alkyl of 1 to 15 carbon atoms; cycloalkyl of 3 to 8 carbon atoms; substituted cycloalkyl which can be substituted once or more by alkyl of 1 to 6 carbon atoms; phenyl; phenyl which can be substituted once or more by alkyl of 1 to 6 carbon atoms or halogen; straight or branched alkenyl having 3 to 15 carbon atoms. y is phenyl or phenyl substituted once or more by alkyl of 1 to 6 carbon atoms; alkoxy wherein the alkyl is 1 to 6 carbon atoms; and halogen selected from the group consisting of bromo, fluoro or chloro.

m is an integer from 0 to 5.

n is an integer from 1 to 5.

R_3 is a group substituted at one or more of the 4, 6 or 7 positions of the pyridine ring said groups being independently selected from hydrogen, alkyl of 1 to 6 carbon atoms; halogen wherein the halogen is selected from bromo, fluoro, or chloro; or alkoxy wherein the alkyl is 1 to 6 carbon atoms.

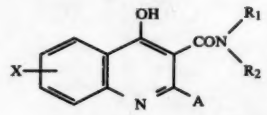
R_4 is hydrogen or alkyl of 1 to 4 carbon atoms.

4,988,708
ANALGESIC AND ANTI-INFLAMMATORY 4-OH QUINOLINE CARBOXYLIC ACID DERIVATIVES

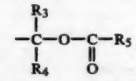
François Clemence; Odile Le Martret, both of Paris and Françoisé Delevalleé, Fontenay-sous-Bois, all of France, assignors to Roussel Uclaf, Paris, France

Continuation-in-part of Ser. No. 30,680, Mar. 24, 1987, Pat. No. 4,845,105, which is a continuation-in-part of Ser. No. 831,356, Feb. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 790,064, Oct. 22, 1985, Pat. No. 4,735,951. This application Apr. 20, 1988, Ser. No. 183,911
Claims priority, application France, Oct. 30, 1984, 8416573; Jul. 25, 1985, 8511389
The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.
Int. Cl.[5] A61K *31/47*; C07D *417/14*, *401/14*, *413/14*
U.S. Cl. 514—312 **36 Claims**

1. A compound selected from the group consisting of a compound of the formula



wherein X is in the 5-, 6-, 7- or 8-position and is selected from the group consisting of hydrogen, halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 4 carbon atoms, $—CF_3$, $—SCF_3$ and $—OCF_3$, R_1 is selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, R_2 is selected from the group consisting of thiazolyl, 4,5-dihydrothiazolyl, pyridinyl, oxazolyl, isoxazolyl, imidazolyl, pyrimidyl and tetrazolyl, all unsubstituted or substituted with alkyl of 1 to 4 carbon atoms and phenyl and phenyl substituted with at least one member of the group consisting of —OH, alkyl and alkoxy of 1 to 4 carbon atoms, $—CF_3$, $—NO_2$ and halogen, A is



in which R_3 and R_4 are individually selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms, phenyl and naphthyl, R_5 is selected from the group consisting of pyridyl, indolyl, thienyl, oxazolyl, thiazolyl, pyrimidyl, benzo thienyl and benzothiazolyl unsubstituted or substituted with alkyl of 1 to 4 carbon atoms and their non-toxic, pharmaceutically acceptable salts with acids or bases.

13. An analgesic and anti-inflammatory composition comprising an analgesically and anti-inflammatorily effective amount of at least one compound selected from the group consisting of a compound of claim 1 and an inert pharmaceutical carrier.

25. A method of relieving pain and inflammation in warm-blooded animals comprising administering to warm-blooded animals an analgesically and anti-inflammatorily effective

amount of at least one compound selected from the group consisting of a compound of claim 1.

4,988,709

QUINOLONE-CARBOXYLIC ACIDS AS ANTIBACTERIAL AGENTS

Masaru Ogata, Hyogo; Hiroshi Matsumoto, Osaka; Sumio Shimizu, Hyogo, and Shiro Kida, Osaka, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

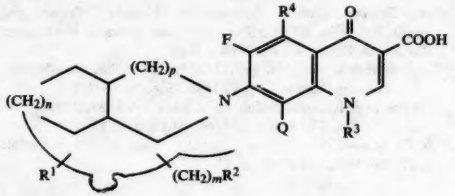
Filed May 15, 1989, Ser. No. 353,321

Claims priority, application Japan, May 23, 1988, 63-126695

Int. Cl.[5] C07D *215/16, 215/54;* A61K *31/47*

U.S. Cl. 514—314 39 Claims

1. A compound of the formula:



wherein R^1 is hydrogen, hydroxy, C_1–C_4alkyl, oxo, or amino; R^2 is hydrogen, hydroxy, or amino optionally substituted by C_1–C_4 alkyl; R^3 is C_1–C_4 alkyl, C_3–C_5 cycloalkyl, or mono or di-fluorophenyl; R^4 is hydrogen, hydroxy, or amino; Q is halogen; m is an integer of 0 or 1; n is an integer of 1, 2, or 3; p is an integer of 1 or 2, or a pharmaceutically acceptable salt thereof.

2. An antibacterial composition comprising an antibacterially effective amount of a compound claimed in claim 1 as an active ingredient and a pharmaceutically acceptable carrier therefor.

4,988,710

ARYL-CYCLOALKYL-ALKANOLAMINES FOR TREATMENT OF CHOLINERGIC NEUROTOXINS

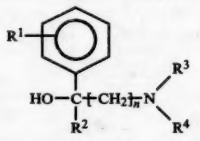
John W. Olney, St. Louis, Mo., assignor to Washington University, St. Louis, Mo.

Filed Aug. 25, 1989, Ser. No. 398,721

Int. Cl.[5] A61K *31/445, 31/40*

U.S. Cl. 514—318 12 Claims

1. A method for reducing the neurotoxic effects of cholinesterase inhibitors, which method comprises treating a susceptible mammal which is to be protected from neurotoxic brain damage that would otherwise be caused by a cholinesterase inhibitor with a therapeutically-effective amount of a compound of the formula:



wherein R^1 is one or more groups independently selected from hydrido, halo, alkyl, acyl, hydroxyalkyl, haloalkyl, aminoalkyl, alkoxy, amino, alkylamino and acylamino; wherein R^2 is selected from hydrido, cycloalkyl, cycloalkenyl, halocycloalkyl, alkylcycloalkyl, acylcycloalkyl, hydroxycycloalkyl, haloalkylcycloalkyl, aminoalkylcycloalkyl, alkoxycyclo-alkyl, aminocycloalkyl, bicycloalkyl, bicycloalkenyl and tricycloalkyl wherein the tricycloalkyl, bicyclo-alkenyl and tricycloalkyl groups may be substituted with one or more groups selected from alkyl, halo, acyl, hydroxy, hydroxyalkyl, haloalkyl, acyl, alkoxy, amino and alkylamino; wherein each of R^3 and R^4 is independently selected from hydrido, alkyl, acyl, alkenyl, cycloalkyl, phenylalkyl, phenyl, aminoalkyl and alkylaminoalkyl; and wherein R^3 and R^4 may be taken together to form a cyclic group including the nitrogen atom of Formula I, and n is an integer selected from one through five.

4,988,711

HMG-COA REDUCTARE-INHIBITING N-SUBSTITUTED N-AMINO-PYRROLES

Rolf Angerbauer; Walter Hübsch; Peter Fey; Hilmar Bischoff, all of Wuppertal; Dieter Petzinna, Duesseldorf; Delf Schmidt, Wuppertal, all of Fed. Rep. of Germany, and Günter Thomas, Arese, Italy, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

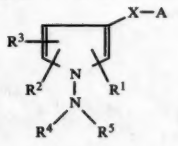
Filed Apr. 12, 1989, Ser. No. 337,001

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1988, 3813776; Italy, Oct. 11, 1988, 22264 A/88

Int. Cl.[5] A61K *31/445;* C07D *401/04*

U.S. Cl. 514—326 11 Claims

1. An N-substituted N-amino-pyrrole of the formula



wherein

R^1 stands for cyclopropyl, cyclopentyl or cyclohexyl, or stands for lower alkyl which can be substituted by fluorine, chlorine, bromine, cyano, hydroxyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, trifluoromethyl, trifluoromethoxy, trifluoromethylsulphonyl, lower alkoxycarbonyl, benzoyl or lower alkylcarbonyl, by a group of the formula NR^6R^7, wherein

R^6 and R^7 are identical or different and denote lower alkyl, phenyl, benzyl, acetyl, benzoyl, phenylsulphonyl or lower alkylsulphonyl,

benzyloxy, benzylthio, benzylsulphonyl, phenylethoxy, phenylethylthio or phenylethylsulphonyl, where the aryl radicals mentioned can be monosubstituted or disubstituted by identical or different fluorine, chlorine, bromine, lower alkyl, lower alkoxy, trifluoromethyl or trifluoromethoxy,

R^2 stands for phenyl or naphthyl, each of which can be monosubstituted to tetrasubstituted by identical or different lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, phenyl, phenyloxy, phenylthio, phenylsulphonyl, benzyl, benzyloxy, benzylthio, benzylsulphonyl, phenethyl, phenylethoxy, phenylethyltion, phenylethylsulphonyl, fluorine, chlorine, bromine, cyano, trifluoromethyl, trifluoromethoxy, trifluoromethylthio or lower alkoxycarbonyl, or by a group of the formula $—NR^6R^7$,

R^3 stands for hydrogen or

for cyclopropyl, cyclopentyl or cyclohexyl or

for lower alkyl which can be substituted by fluorine, chlorine, cyano, hydroxyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, trifluoromethyl, lower alkoxycarbonyl, benzoyl or lower alkylcarbonyl, or by a group of the formula $—NR^6R^7$,

or phenyl, phenoxy, phenylsulphonyl, benzyloxy or phenylethoxy, where the aryl radicals mentioned can be monosubstituted or disubstituted by identical or different fluorine, chlorine, lower alkyl, lower alkoxy or trifluoromethyl,

or

denotes phenyl or naphthyl, which can be monosubstituted or disubstituted by identical or different lower alkyl, lower hydroxyalkyl, lower alkoxy, phenyl, phenyloxy,

benzyl, benzyloxy, phenethyl, phenylethoxy, fluorine, chlorine, cyano, trifluoromethyl or lower alkoxycarbonyl, or by a group of the formula $—NR^6R^7$,

R^4 and R^5 can be identical or different and

stand for hydrogen,

stand for cyclopropyl, cyclopentyl or cyclohexyl,

or stand for lower alkyl which can be substituted by fluorine, chlorine, hydroxyl, lower alkoxy, trifluoromethyl or benzoyl, or by a group of the formula $—NR^6R^7$,

or phenyl, phenoxy, benzyloxy or phenylethoxy, where the aryl radicals mentioned can be monosubstituted or disubstituted by identical or different fluroine, chlorine, lower alkyl, lower alkoxy or trifluoromethyl, or

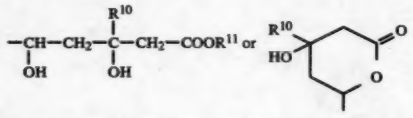
stand for phenyl or naphthyl, each of which can be monosubstituted or disubstituted by identical or different lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, phenyl, phenyloxy, phenylthio, phenylsulphonyl, benzyl, benzyloxy, phenethyl, phenylethoxy, fluorine, chlorine, cyano, trifluoromethyl or lower alkoxycarbonyl, or by a group of the formula $—NR^6R^7$,

or

R^4 and R^5, together with the N atom, form a 5- to 7-membered heterocycle which can be substituted by lower alkyl,

X stands for a group of the formula $—CH_2—CH_2—$ or $—CH=CH—$, and

stands for a group of the formula



wherein

R^{10} denotes hydrogen or lower alkyl, and

R^{11} denotes a C_1–C_6-alkyl radical, a C_6–C_{12}-alkyl radical or a C_7–C_{10}-alkyl radical or

denotes a physiologically tolerable cation.

10. A method of inhibiting HMG-CoA reductase in a patient in need thereof which comprises administering to such patient an amount effective therefor of a compound according to claim **1**.

4,988,712

INSECTICIDAL AZOLYLMETHYL-1,2-DIHYDROPYRIDINES

Kozo Shiokawa, Kawasaki; Shinichi Tsuboi; Shoko Sasaki, both of Hino; Koichi Moriya, Tokyo; Yumi Hattori, and Katsuhiko Shibuya, both of Hachioji, all of Japan, assignors to Nihon Tokushu Noyaku Seizo, K.K., Tokyo, Japan

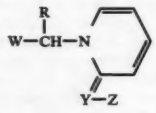
Division of Ser. No. 243,545, Sep. 13, 1988, Pat. No. 4,882,344, which is a division of Ser. No. 88,932, Aug. 24, 1987, Pat. No. 4,803,277. This application Aug. 14, 1989, Ser. No. 393,508

Claims priority, application Japan, Sep. 10, 1986, 61-211753

Int. Cl.[5] A61K *31/44;* **C07D** *413/06*

U.S. Cl. 514—340 **7 Claims**

1. A heterocyclic compound of the formula



wherein

W is an unsaturated 5-membered heterocyclic group which contains a nitrogen hetero atom plus a sulfur or oxygen hetero atom, a ring carbon of W linking to CHR, the heterocyclic group being optionally substituted by a substituent selected from the group consisting of halogen, C_1–C_4 alkyl optionally substituted by halogen, C_1–C_4 alkoxy optionally substituted by halogen, C_2–C_4 alkenyl optionally substituted by halogen, C_2–C_4 alkenyl optionally substituted by halogen, C_1–C_4 alkylsulfinyl, C_1–C_4 alkylsulfonyl and C_3–C_4 alkynyl,

R is hydrogen or methyl,

Y is =N— or =CH—, and

Z is nitro or cyano.

4,988,713

2-SELENOMETHYL-1,4-DIHYDROPYRIDINES HAVING CALCIUM-ANTAGONISTIC PROPERTIES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Marco Frigerio; Carmelo A. Gandolfi; Odoardo Tofanetti, and Sergio Tognella, all of Milan, Italy, assignors to Boehringer Biochemia Robin S.p.A., Milan, Italy

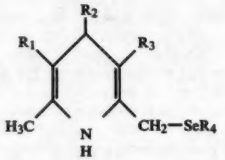
Continuation of Ser. No. 199,234, May 27, 1988, abandoned. This application Sep. 7, 1989, Ser. No. 404,069

Claims priority, application Italy, May 29, 1987, 20728

Int. Cl.[5] C07D *211/86,* **A61K** *31/455*

U.S. Cl. 514—356 **5 Claims**

1. A compound of formula I



I

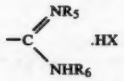
wherein:

R_1 is a —COOR, nitro or cyano group;

R_2 is a phenyl group, optionally substituted by a substituent selected from the group consisting of halogen atoms, nitro, and C_1–C_6-alkylthio;

R_3 is a COOR group;

R_4 is a C_1–C_6 alkyl group, optionally substituted by an amino group phenyl; or a group of the formula



wherein X is a halogen atom and R_5 and R_6 are hydrogen; and

R is a C_1–C_4-alkyl group optionally substituted by a C_1–C_6-alkoxy group, an addition salt thereof with a pharmaceutically acceptable acid or base, an enantiomer, diastereoisomer or mixture thereof.

4,988,714

PYRIDINE-ETHANOLAMINE DERIVATIVES

Leo Alig, Kaiseraugst, and Marcel Müller, Frenkendorf, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

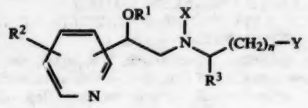
Division of Ser. No. 57,150, Jun. 3, 1987, Pat. No. 4,800,206. This application Aug. 26, 1988, Ser. No. 236,802

Claims priority, application Switzerland, Jun. 27, 1986, 2608/86; Mar. 27, 1987, 1186/87

Int. Cl.[5] A61K *31/44;* **C07D** *213/30*

U.S. Cl. 514—357 **24 Claims**

1. A compound of the formula

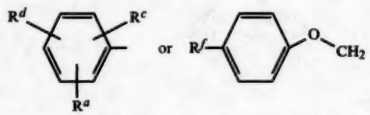


wherein

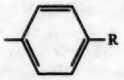
n is 1 or 2

X is a group X^a of the formula

Z is a group of the formula



Y is



R is R^o or OR″

R^o is lower-alkyl, COR^4 or $C(R^5)$=$CHCOR^4$,

R″ is hydrogen, lower-alkyl, lower-alkanoyl, $(CH_2)_{1-6}$—OH, $(CH_2)_{1-6}$—$O(CH_2)_{1-6}$—R^6 or $(CH_2)_{1-6}$—COR^4

R^1 and R^a are hydrogen, lower-alkanoyl, benzoyl or $(CH_2)_{1-6}$—OH

R^2 is hydrogen, Cl, Br or CF_3,

R^3 and R^5 are hydrogen or CH_3,

R^4 is hydroxy, lower-alkoxy or $N(R^7,R^8)$,

R^6 is hydrogen R^g, OH or COR^4,

R^7 and R^8 are hydrogen or lower-alkyl,

R^c and R^e are hydrogen, Cl, F, Br or CF_3,

R^d is hydrogen or NH_2,

R^f is hydrogen, CH_3CONH, NH_2COCH_2 or $R^9CH_2CH_2OCH_2CH_2O$,

R^g and R^9 are phenyl or phenyl substituted by Cl, F or Br,

an enantiomer, diastereomer or racemate thereof or a physiologically compatible salt thereof.

4,988,715

MICROBICIDAL SUBSTITUTED DIOXOLANES

Hans-Ludwig Elbe; Eckart Kranz, both of Wuppertal; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

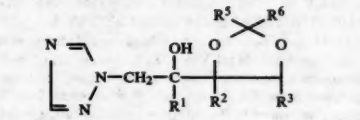
Filed Aug. 3, 1989, Ser. No. 389,032

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1988, 3827134

Int. Cl.[5] **A01N** *43/653;* **C07D** *249/08*

U.S. Cl. 514—383 **10 Claims**

1. A substituted dioxolane of the formula



I

(I)

in which

R^1 represents straight-chain or branched alkyl with 1 to 8 carbon atoms, cycloalkylalkyl with 3 to 6 carbon atoms in the cycloalkyl part and 1 to 6 carbon atoms in the alkyl part, phenyl optionally substituted by 1 to 3 identical or different substituents selected from the group consisting of fluorine, chlorine, bromine, methyl and trifluoromethoxy, or represents phenylalkyl with 1 to 6 carbon atoms in the alkyl part, the phenyl part being optionally substituted by 1 to 3 identical or different substituents selected from the group consisting of fluorine, chlorine, bromine, methyl and trifluoromethoxy, or represents phenoxyalkyl with 1 to 6 carbon atoms in the alkyl part, the phenyl part being optionally substituted by 1 to 3 identical or different substituents selected from the group consisting of fluorine, chlorine, bromine and trifluoromethoxy, and

R^2, R^3, R^5 and R^6 each independently represents hydrogen or methyl,

or an addition product thereof with an acid or metal salt.

4,988,716

INHIBITORS OF SLOW REACTING SUBSTANCE OF ANAPHYLAXIS

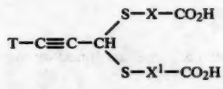
Anil K. Saksena, Upper Montclair; Jesse K. Wong, Union, both of N.J., and Pietro Mangiaracina, Monsey, N.Y., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 866,996, May 19, 1986, Pat. No. 4,758,594, which is a continuation of Ser. No. 632,143, Jul. 18, 1984, abandoned. This application Jul. 28, 1987, Ser. No. 79,202

Int. Cl.[5] **A61K** *31/19, 31/205;* **C07C** *323/54*

U.S. Cl. 514—554 **6 Claims**

1. A compound having the structural formula



or a pharmaceutically acceptable salt thereof formed with ammonia, an organic amine or an alkali metal base, where T is alkyl of from 8 to 13 carbon atoms; and X and X^1 are straight chain alkylene having 2 or 3 carbon atoms.

6. A method for treating allergic reactions in mammal, which comprises administering a compound having structural formula I as defined in claim 1, to said mammal in an amount effective to treat allergic reaction.

4,988,717

OPTICALLY ACTIVE 1,4-DIHYDROPYRIDINE ESTERS USEFUL FOR TREATING CIRCULATORY ILLNESSES

Egbert Wehinger, Velbert; Horst Meyer; Friedrich Bosseret, both of Wuppertal; Wulf Vater, Leverkusen, all of Fed. Rep. of Germany; Robertson Towart, Stoke Poges, England; Kurt Stoepel, and Stanislav Kazda, both of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 12,515, Feb. 9, 1987, Pat. No. 4,849,433, which is a continuation of Ser. No. 718,916, Apr. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 429,732, Sep. 30, 1982, Pat. No. 4,510,310, which is a continuation of Ser. No. 181,453, Aug. 25, 1980, abandoned. This application Mar. 30, 1989, Ser. No. 331,312

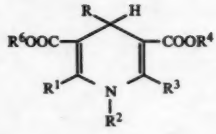
Claims priority, application Fed. Rep. of Germany, Sep. 1, 1979, 2935451

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[5] C07D *211/90;* A61K *31/44*

U.S. Cl. 514—356 11 Claims

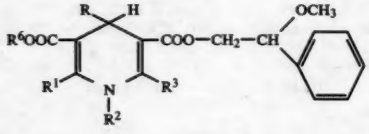
1. A compound which is an antipode of a chiral 1,4-dihydropyridinecarboxylic acid ester with different, achiral substituents, of the formula



(Ia)

or a pharmaceutical acceptable salt thereof,

or is a 1,4-dihydropyridinecarboxylic acid ester of the formula



(Ib)

in which

R represents phenyl which is monosubstituted by nitro,

R^1 and R^3 each denote a methyl group,

R^2 denotes a hydrogen atom, and

R^4 and R^6 each denotes a different achiral alkyl radical having 1 to 4 carbon atoms and optionally substituted by an alkoxy group with 1 to 4 carbon atoms.

9. A method of treating circulatory illnesses in warm-blooded animals which comprises administering to the animals a circulation influencing amount of an active compound according to claim 1 either alone or in admixture with an inert pharmaceutical carrier or in the form of a medicament.

4,988,718

PESTICIDAL SUBSTITUTED 4-HETEROCYCLYLOXIMINO-PYRAZOLIN-5-ONES, COMPOSITIONS AND USE

Kurt Findeisen, Odenthal; Klaus Jelich, Wuppertal, and Gerd Hanssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

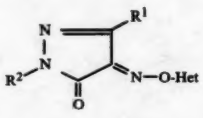
Continuation-in-part of Ser. No. 403,266, Sep. 5, 1989, Pat. No. 4,968,687. This application Aug. 9, 1990, Ser. No. 565,294

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831430

Int. Cl.[5] A61K *43/56, 43/82;* C07D *403/12, 417/12*

U.S. Cl. 514—363 10 Claims

1. A substituted 4-heterocyclyloximino-pyrazolin-5-one of the formula



(I)

in which

R^1 and R^2 independently of one another in each case represent hydrogen, alkyl, alkenyl, alkinyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, alkylthioalkyl, alcoxycarbonyl, hydroxycarbonylalkyl, alkoxycarbonylalkyl, aminocarbonylalkyl, alkylaminocarbonylalkyl or dialkylaminocarbonylalkyl, or represent in each case unsubstituted or in each case substituted oxiranylalkyl, aralkyl, heterocyclyl or aryl and

Het represents an unsubstituted or substituted five-membered heterocycle.

8. A fungicidal composition comprising a fungicidally effective amount of a compound according to claim 1 and a diluent.

4,988,719

3,7-DISUBSTITUTED BENZOTHIAZOLONES AND FUNGICIDAL USE THEREOF

Klaus Wagner, Cologne, and Gerd Hänssler, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

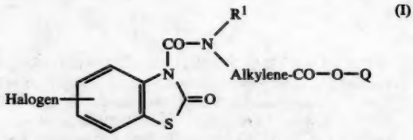
Filed Mar. 21, 1989, Ser. No. 326,859

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810077; Oct. 19, 1988, 3835576

Int. Cl.[5] A01N *43/78;* C07D *277/70*

U.S. Cl. 514—369 6 Claims

1. A disubstituted benzothiazolone of the formula



(I)

in which

R^1 is hydrogen or alkyl, and

Q is a hydrocarbyl radical.

5. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a compound according to claim 1.

4,988,720

NOVEL TREATMENT OF HYPERGLYCAEMIA

Michael A. Cawthorne, Horsham, England, assignor to Beecham Group P.L.C., Middlesex, England

Division of Ser. No. 866,307, May 23, 1986, Pat. No. 4,847,280. This application Apr. 11, 1989, Ser. No. 336,241

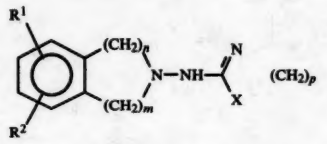
Claims priority, application United Kingdom, May 28, 1985, 8513367; Aug. 17, 1985, 8520651

Int. Cl.[5] A61K *31/42, 31/47, 31/55, 31/425*

U.S. Cl. 514—377 3 Claims

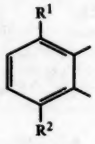
1. A method for the treatment of hyperglycaemia in human or non-human mammals which comprises administering to the mammal in need of such treatment an effective non-toxic amount of:

a compound of formula (I):



(I)

or a pharmaceutically acceptable acid addition salt thereof, wherein each of R^1 and R^2, which may be the same or different, represents a hydrogen, halogen atom, or an alkyl or alkoxy group containing 1 to 4 carbon atoms, X represents an oxygen, sulphur atom or a methylene group, each of n and m, which may be the same or different, represents the number 1, 2, or 3, and p represents the number 2; with the proviso than when the moiety



is present in formula (I), then either R^1 or R^2 must represent hydrogen.

4,988,721

0-(1,2,4-TRIAZOL-1-YL) O-PHENYL ACETALS USEFUL AS FUNGICIDES

Ulf Baus, Dossenheim; Wolfgang Reuther, Heidelberg; Gisela Lorenz, Neustadt, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

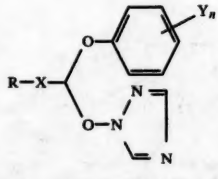
Filed Feb. 9, 1990, Ser. No. 477,730

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1989, 3905766

Int. Cl.[5] A01N *43/653;* C07D *249/08*

U.S. Cl. 514—383 5 Claims

1. A compound of the formula (I):



(I)

wherein

R is tert-alkyl of from 4 to 6 carbons, phenyl or phenyl which is substituted form 1 to 5 times by halogen, phenyl, phenoxy or alkoxy of from 1 to 4 carbons,

X is C=O, C=NOH, C=NOR', CHOH, CHOR', or CHOC(=O)R', wherein R' is alkyl of from 1 to 4 carbons,

Y is hydrogen, alkyl of from 1 to 9 carbons, alkoxy of from 1 to 4 carbons, halogen, phenyl, or phenoxy,

n is from 1 to 5;

acid addition salts thereof, wherein said acid is selected from the group consisting of hydrochloric, hydrobromic, nitric, oxalic, acetic, sulfuric, phosphoric, and dodecylbenzenesulfonic acid, and

metal complexes thereof, wherein said metal is selected from the group consisting of cooper, zinc, iron manganese and nickel.

4,988,722

PARENTERAL COMPOSITIONS

Pui-Ho Yuen, Princeton Junction, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Oct. 3, 1989, Ser. No. 416,553

Int. Cl.[5] A61K *31/41*

U.S. Cl. 514—383 5 Claims

1. A process for the preparation of an aqueous paronteral composition of the drug (±) (2R*,3R*)-2-(2,4-difluorophenyl) -3-methylsulfonyl-1-(1,2,4-triazol-1-yl)-butan-2-ol which comprises mixing an aqueous solution of an alkali metal salt selected from the group consisting of sodium hydroxide and postassium hydroxide, with an aqueous acid solution of the drug, a mineral acid selected from the group consisting of hydrochloric acid and sulfuric acid, and a compound capable of providing buffering action at a pH of from 5 to 8 after the solutions are mixed, said composition being physically stable for up to 8 hours.

4,988,723

BENZOPYRAN DERIVATIVES AND THEIR USE AS ANTI-HYPERTENSIVES

Youichi Shiokawa, Ibaraki; Koichi Takimoto, Takarazuka; Kohei Takenaka, Sakai, and Takeshi Kato, Ikeda, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

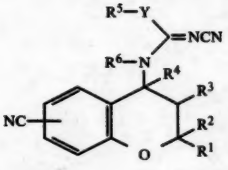
Filed May 17, 1989, Ser. No. 352,990

Claims priority, application United Kingdom, Jun. 2, 1988, 8813044; Aug. 16, 1988, 8819449; Jan. 4, 1989, 8900089

Int. Cl.[5] A61K *31/425, 31/35;* C07D *413/04, 417/04*

U.S. Cl. 514—392 15 Claims

1. A compound of the formula:



wherein

R^1 and R^2 are each lower alkyl,

R^3 is hydroxy or acyloxy and R^4 is hydrogen, or

R^3 and R^4 are linked together to form a bond,

Y is —S—, —O— or a group of the formula

wherein R^7 is hydrogen, acyl, lower alkyl or mono or di or tri-phenyl(lower)alkyl, and

R^5 and R^6 are each hydrogen or lower alkyl, or

R^5 and R^6 are linked together to form lower alkylene, or pharmaceutically acceptable salt thereof.

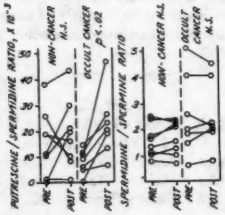
15. A method for the treatment of hypertension which comprises administering an effective amount of a compound of claim 1 or pharmaceutically acceptable salt thereof to a human or animal.

4,988,724

METHODS AND IMPROVED FORMULATIONS FOR THE DETERMINATION AND TREATMENT OF MALIGNANT DISEASE IN PATIENTS

Jaffer Ajani; Bruce Grossie, Jr.; Kenji Nishioka, and David M. Ota, all of Houston, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Dec. 9, 1988, Ser. No. 282,126
Int. Cl.[5] A61K *31/41, 31/40, 31/195*
U.S. Cl. 514—399 **19 Claims**



1. A formulation for the prevention of stimulation of tumor growth in patients with malignant disease, comprising a pharmacologically acceptable amount of:

(a) a mixture of the following essential amino acids in a concentration of between 0.01 to 5.0% by weight of the formulation:
leucine;
methionine;
phenylalanine;
lysine;
valine;
isoleucine;
threonine;
tryptophan;
histidine;

(b) at least one amino acid selected from the group consisting of:
0.01–2% by weight final concentration of citrulline; and
0.51%–5% by weight final concentration of ornithine;

(c) at least one non-essential amino acid in a concentration of between 0.01–5% by weight of the formulation selected from the group consisting of:
alanine;
proline;
serine; and
tyrosine; and

(d) less than 0.10% by weight final concentration of arginine, the foregoing amino acids being dispersed in a suitable liquid medium.

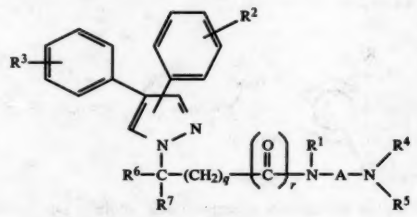
4,988,725

1H-PYRAZOLE-1-(BRANCHED)ALKANAMIDES AS ANTIARRHYTHMIC AGENTS, COMPOSITIONS AND USE

Denis M. Bailey, Greenbush, and Ronald G. Powles, Rotterdam, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 327,228, Mar. 22, 1989, Pat. No. 4,916,150.
This application Dec. 28, 1989, Ser. No. 457,989
The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.
Int. Cl.[5] A61K *31/415;* **C07D** *231/12*
U.S. Cl. 514—406 **13 Claims**

1. A compound of formula



or acid addition salt thereof wherein R^1 is hydrogen or lower-alkyl; R^2 and R^3 are independently hydrogen, hydroxy, lower-alkyl, lower-alkoxy, or halo; R^4 and R^5 are independently hydrogen or lower-alkyl, or R^4 and R^5 together form a straight or branched alkylene chain of four to six carbon atoms; R^6 and R^7 are independently hydrogen or straight-chain lower-alkyl provided that R^6 and R^7 are not both hydrogen; r is one; q is zero; and A is $CH_2CH(OH)CH_2$ or $(CH_2)_n$ wherein n is an integer from two to eight.

8. A composition for treating cardiac arrhythmias comprising an amount of a compound according to claim 1 effective to treat cardiac arrhythmias together with one or more pharmaceutically acceptable excipients or diluents.

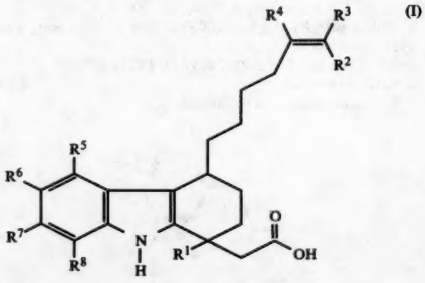
4,988,726

SUBSTITUTED 2,3,4,9-TETRAHYDRO-1H-CARBAZOLE-1-ACETIC ACID DERIVATIVES, COMPOSITION AND USE

Dominick Mobilio, Franklin Park, N.J., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 359,560, Jun. 1, 1989, Pat. No. 4,886,826.
This application Sep. 29, 1989, Ser. No. 414,880
Int. Cl.[5] A61K *31/40;* **C07D** *209/86*
U.S. Cl. 514—411 **7 Claims**

1. A compound of the formula (I)



(I)

wherein R^1 is lower alkyl containing 1 to 6 carbon atoms and R^2, R^3, R^4, R^5, R^6, R^7 and R^8 are independently H, or lower alkyl containing 1 to 6 carbon atoms or a pharmaceutically acceptable salt thereof.

7. A method for treating allergic or asthmatic conditions in a mammal which comprises the administration to said mammal of an effective amount of a compound selected from those of formula (I), or a pharmaceutically acceptable salt thereof, as defined in claim 1.

4,988,727

N-(AMINOINDANYL)AMIDES AS ANALGESICS AND ANTIARRHYTHMICS

Francois Clemence, and Michel Fortin, both of Paris, France, assignors to Roussel Uclaf, Paris, France

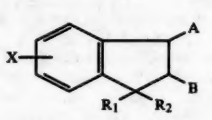
Division of Ser. No. 136,814, Dec. 22, 1987, Pat. No. 4,888,355. This application Sep. 19, 1989, Ser. No. 409,048

Claims priority, application France, Dec. 23, 1986, 86 1802

Int. Cl.[5] A61K *31/40, 31/38, 31/335, 31/495;* C07D *405/10, 401/10, 407/10*

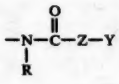
U.S. Cl. 514—422 16 Claims

1. A compound selected from the group consisting of all enantiomeric and diastereoisomeric forms possible of compounds of the formula

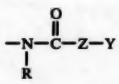


1

wherein X is selected from the group consisting of hydrogen, halogen, and alkyl and alkoxy of 1 to 5 carbon atoms, R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms, one of A and B being



and the other being



R is hydrogen or alkyl of 1 to 5 carbon atoms, Z is $-(CH_2)_n-$ or branched alkylene of 2 to 8 carbon atoms, n is an integer from 0 to 5, Y is selected from the group consisting of benzofuranyl, benzothienyl or thienyl, R_3 and R_4 are individually hydrogen or alkyl of 1 to 5 carbon atoms or taken together with the nitrogen form a heterocyclic of 5 to 6 ring members and optionally containing —O—, —D— or nitrogen in the ring or their non-toxic, pharmaceutically acceptable acid addition salts.

11. A method of inducing antiarythmic activity in warm-blooded animals comprising administering to warm-blooded animals an antiarythmically effective amount of at least one compound of claim 1.

4,988,728

SUPROFEN ESTERS AND AMIDES AS OPHTHALMIC ANTI-INFLAMMATORY AGENTS

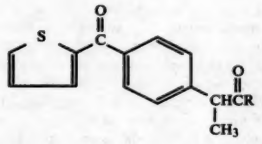
Steven H. Gerson, and Wesley W. Han, both of Fort Worth, Tex., assignors to Alcon Laboratories, Inc., Ft. Worth, Tex.

Continuation of Ser. No. 431,516, Nov. 3, 1989, abandoned, which is a continuation of Ser. No. 241,759, Sep. 7, 1988, abandoned, which is a continuation of Ser. No. 948,184, Dec. 31, 1986, abandoned. This application Jul. 23, 1990, Ser. No. 560,488

Int. Cl.[5] A61K *31/21;* C07D *333/22*

U.S. Cl. 514—448 8 Claims

1. A compound of the following formula:



wherein R is selected from the group consisting of alkoxyl and hydroxyalkoxyl of 3 to 8 carbon atoms and alkylamino of 3 to 8 carbon atoms.

4,988,729

PESTICIDES BASED ON SUBSTITUTED AMINOMETHYLHETEROCYCLIC COMPOUNDS

Wolfgang Krämer, Burscheid; Joachim Weissmüller, Monheim; Graham Holmwood; Dieter Berg, both of Wuppertal; Stefan Dutzmann, Duesseldorf; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

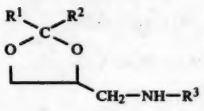
Continuation of Ser. No. 184,865, Apr. 22, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 423,607

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715482

Int. Cl.[5] A01N *43/28, 43/24*

U.S. Cl. 514—452 9 Claims

1. A method of combating fungi or bacteria, which comprises applying to such fungi, such bacteria, or to a habitat thereof a fungicidally or bactericidally effective amount of an aminomethylheterocyclic compound of the formula



(I)

in which

R^1 represents hydrogen alkyl having 1 to 18 carbon atoms or alkenyl having 3 to 12 carbon atoms; tetrahydronaphthyl, decahydronaphthyl, cycloalkyl, cycloalkenyl, cycloalkylalkyl, cycloalkenylalkyl, cycloalkyloxyalkyl or cycloalkylthioalkyl in each case having 5 to 7 carbon atoms in the cycloalkyl or cycloalkenyl parts and 1 to 6 carbon atoms in the straight-chain or branched alkyl parts, each unsubstituted or substituted by substituents selected from the group consisting of alkyl, alkoxy, halogenoalkyl and halogenoalkoxy having 1 to 6 carbon atoms and up to 9 identical or different halogen atoms; or phenylalkyl, phenoxyalkyl, phenylthioalkyl, phenylsulphinylalkyl, phenylsulphenylalkyl or phenylalkenyl having up to 6 carbon atoms in the alkyl or alkenyl parts, the phenyl radicals optionally being substituted by substituents which are identical or different and are selected from the group consisting of halogen, cyano, nitro, alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy or halogenoalkylthio

having 1 to 6 carbon atoms and up to 9 identical or different halogen atoms, cyclohexyl and phenyl;

R^2 represents hydrogen or methyl, and

R^3 represents alkyl having 1 to 12 carbon atoms, alkenyl having 3 to 8 carbon atoms, alkynyl having 3 to 8 carbon atoms, hydroxyalkyl having 2 to 6 carbon atoms, alkoxyalkyl or dialkoxyalkyl having 1 to 6 carbon atoms in the individual alkyl parts or hydroxyalkoxyalkyl having 2 to 6 carbon atoms in the individual alkyl parts; or cycloalkyl or cycloalkylalkyl each of which has 3 to 7 carbon atoms in the cycloalkyl part and 1 to 4 carbon atoms in the alkyl part and each of which is unsubstituted or substituted in the cycloalkyl part by identical or different substitutents selected from the group consisting of halogen and alkyl, alkoxy, halogenoalkyl and halogenoalkoxy having 1 to 4 carbon atoms and up to 9 identical or different halogen atoms; or phenyl, phenylalkyl or phenylalkenyl each of which has up to 6 carbon atoms in the alkyl or alkenyl part and each of which is unsubstituted or substituted in the phenyl part by identical or different substitutents selected from the group consisting of halogen, cyano, nitro and alkyl, alkoxy, alkylthio, halogenoalkyl, halogenoalkoxy, halogenoalkylthio, alkoxycarbonyl and alkoximinoalkyl having 1 to 4 carbon atoms in the individual alkyl parts and up to 9 identical or different halogen atoms; or furanylalkyl, tetrahydrofuranylalkyl, tetrahydropyranylalkyl, dioxolanylalkyl or dioxanylalkyl in each having 1 to 4 carbon atoms in the alkyl part, and unsubstituted or substituted by halogen or alkyl, alkoxy, halogenoalkyl or halogenoalkoxy having 1 to 4 carbon atoms and up to 9 identical or different halogen atoms,

or an acid addition salt thereof.

4,988,730

DIPHENKYLPROPYLAMINES FOR THE THERAPY OF HEART DISEASE

Dezso Korbonits; Pál Kiss, both of Budapest; László Szekeres; Gyula Papp, both of Szeged; Gábor Kovács, Budapest; Andrea Sántáné Csutor, Budapest; Sándor Virág, Budapest; Éva Udvari, Szeged; Imre Bata, Budapest; Katalin Mármarosi née Kellner, Biatorbágy; László Tardos, Budapest; Péter Körmöczy, Budapest; Vera Gergely, Budapest, and Zoltán Vargai, Budapest, all of Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyar RT, Budapest, Hungary

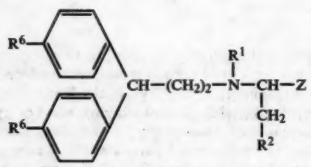
Continuation of Ser. No. 72,457, Jul. 13, 1987, abandoned. This application Jul. 21, 1989, Ser. No. 385,539

Claims priority, application Hungary, Jul. 11, 1986, 2873/86; May 20, 1987, 2873/86

Int. Cl.[5] A61K *31/135, 31/36;* **C07C** *87/28;* **C07D** *317/58*

U.S. Cl. 514—466 **6 Claims**

1. A compound of the formula (I)



(I)

wherein

R^1 stands for hydrogen or a methyl group;

R^2 stands for hydrogen;

Z means a phenyl group substituted by R^3, R^4 and R^5, wherein

R^3 means hydrogen, or a nitro, C_{1-12} alkyl, C_{1-4}alkoxy, phenoxy or benzyloxy group;

R^4 and R^5 represent hydrogen, alkoxy, benzyloxy, acetamino or carboxy group; or

R^4 and R^5 together form a methylendioxy group;

or

Z may stand for a 4-methoxynaphthyl or 4-ethoxynaphthyl group;

R^6 is hydrogen,

with the proviso that R^1, R^2, R^3, R^4, R^5 and R^6 cannot simultaneously all stand for hydrogen,

or a physiologically acceptable acid addition salt thereof.

4. A pharmaceutical composition for treating angina or arrhythmia, which comprises as active ingredient a therapeutically effective amount of a compound as defined in claim 1 or a physiologically acceptable acid addition salt thereof in admixture with inert, nontoxic carriers and/or additives commonly used in the pharmaceutical industry.

4,988,731

SODIUM HYDROGEN DIVALPROATE OLIGOMER

Edwin M. Meade, Duncan, Canada, assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation-in-part of Ser. No. 68,284, Aug. 20, 1979, abandoned.

This application Nov. 9, 1987, Ser. No. 117,945

Int. Cl.[5] A61K *31/00;* **C07C** *53/128*

U.S. Cl. 514—577 **2 Claims**

1. An oligomer having a 1:1 molar ratio of sodium valproate and valproic acid of the unit formula, $(CH_3CH_2CH_2)_2CHCO_2$. $Na/(CH_3CH_2CH_2)_2CHCO_2H$, and containing about 4 such units.

4,988,732

3,7,11,15-TETRAMETHYL-2,4,6,10,14-HEXADECAPENTAENOIC ACID COMPOSITION AND USE FOR TREATING PAPILLOMATA

Isao Yamatsu, Kawaguchi; Yuichi Inai, Tokyo; Shinya Abe, Kawagoe; Takeshi Suzuki, Abiko; Yoshikazu Suzuki, Ichinomiya; Osamu Tagaya, Gifu; Kouichi Suzuki, Kakamigahara; Koichi Abe, Fuchu, and Kouji Yamada, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1981, Ser. No. 249,245

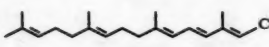
Claims priority, application Japan, Apr. 7, 1980, 55-44558

The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.

Int. Cl.[5] A61K *31/20*

U.S. Cl. 514—560 **2 Claims**

1. A pharmaceutical composition for reducing the size of papillomata on a subject, comprising a therapeutically effective amount of 3,7,11,15-tetramethyl-2,4,6,10,14-hexadecapentaenoic acid of the formula (I):



(I)

or a pharmaceutically acceptable salt thereof, and a pharmaceutical carrier.

4,988,733

N-[1-(3-PHENOXYPHENYL)ETHYL]ACETOHYDROXAMIC ACID COMPOSITIONS WHICH ARE USEFUL ANTI-INFLAMMATORY AGENTS

John A. Salmon, and William P. Jackson, both of Beckenham, England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

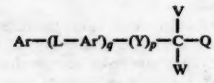
Filed Jul. 14, 1988, Ser. No. 219,096

Claims priority, application United Kingdom, Jul. 15, 1987, 8716640; Feb. 3, 1988, 8802378; Mar. 16, 1988, 8806278

Int. Cl.[5] C07C *83/10;* **A61K** *31/185*

U.S. Cl. 514—575 **11 Claims**

1. A compound of formula (II)



(II)

wherein

q is 1 and p is 1;

Ar is phenyl optionally substituted by one or more substituents independently selected from C_{1-4} alkyl (which may be substituted by one or more halogen atoms) and halogen;

L is —O—;

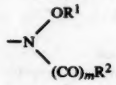
Ar' is 1,3- or 1,4-phenylene;

Y is (E)—CH=CH—;

V is hydrogen or C_{1-4} alkyl;

W is C_{1-4} alkyl; and

Q is a moiety of formula



wherein m is 1, R^1 is hydrogen, and R^2 is hydrogen or C_{1-4} alkyl;

and salts thereof.

3. A compound of formula (II) which is selected from the following:

(E)-N-[1-Methyl-3-(3-phenoxyphenyl)prop-2-enyl]acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(4-methylphenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(4-t-butylphenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(4-chlorophenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(4-bromophenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(3-trifluoromethylphenoxy)phenyl]-prop-2-enyl}acetohydroxamatic acid;

(E)-N-{1-Methyl-3-[3-(3,5-dichlorophenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

(E)-N-{1-Methyl-3-[3-(4-fluorophenoxy)phenyl]prop-2-enyl}acetohydroxamic acid; and

(E)-N-{1-Methyl-3-[3-(2,4-difluorophenoxy)phenyl]prop-2-enyl}acetohydroxamic acid;

in either its (+) or (−) enantiomeric form or as a mixture thereof in any proportions,

and salts thereof.

4,988,734

FUNGICIDAL STEREOISOMERS OF N-(R)-(1-ARYL-ETHYL)-1-ALKYL-2,2,-DICHLORO-CYCLOPROPANECARBOXAMIDES

Udo Kraatz, and Gerd Hänssler, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

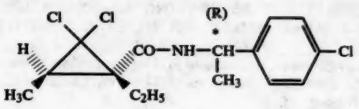
Filed Apr. 13, 1989, Ser. No. 337,494

Claims priority, application Fed. Rep. of Germany, May 7, 1988, 3815728

Int. Cl.[5] A61K *31/165*; C07C *233/59*

U.S. Cl. 514—624 **6 Claims**

1. The stereoisomer N-(R)-(1-(4-chloro-phenyl)ethyl)-(IS)-2,2-dichloro-1-ethyl-3t-methyl-1-cyclopropanecarboxamide of the formula



(Ia)

substantially free of other stereoisomers.

4,988,735

ETHYLENE DIAMINE ACTIVE CARDIOVASCULAR THERAPY

Cesare Casagrande, Arese; Francesco Santangelo, and Maria L. Calabi, both of Milan, all of Italy, assignors to Simes, Vicenza, Italy

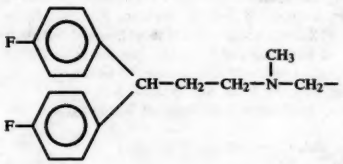
Filed May 24, 1988, Ser. No. 197,977

Claims priority, application Italy, Jun. 5, 1987, 20800 A/87

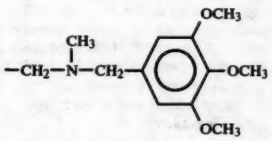
Int. Cl.[5] A61K *31/165*; C07C *217/58*

U.S. Cl. 514—648 **5 Claims**

1. The comound N,N'-dimethyl-N-(3,4,5-trimethoxybenzyl)-N'-[3,3-di-(4-fluorophenyl)-propyl]-ethylenediamine of formula



(II)



and its salts with pharmaceutically acceptable acids.

2. A method for the treatment of cardiac decompensation consisting in administering to the patient an effective amount of a compound according to claim 1.

4,988,736

USE OF D-PROPRANOLOL AGAINST SEXUALLY TRANSMITTED BACTERIA

Robin G. Foldesy, Raleigh, N.C., assignor to Family Health International, Durham, N.C.

Filed Oct. 20, 1989, Ser. No. 424,399

Int. Cl.[5] A61K *31/135*

U.S. Cl. 514—652 **14 Claims**

1. A method of inhibiting the activity of bacteria comprising exposing the bacteria to a composition comprising D-propranolol, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier, said D-propranolol, or said pharmaceutically acceptable salt thereof being at a concentration in said pharmaceutically acceptable carrier to provide a composition effective in inhibiting sexually transmitted bacteria.

4,988,737

PROCESS FOR REGENERATING ION EXCHANGE RESINS LOADED WITH NAPHTHENIC AND OTHER ORGANIC ACIDS

W. Thomas Matthews, Alamo, and H. Hunter Paalman, Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 814,358, Dec. 30, 1985, abandoned. This application Apr. 13, 1987, Ser. No. 38,437

Int. Cl.[5] L08J 5/20

U.S. Cl. 521—26 21 Claims

1. An improved method for regenerating the anion exchange capacity of a weak-base resin loaded with organic acids and other organic compounds typically present in oil field waters consisting essentially of contacting the loaded anion exchange resin with an aqueous liquid mixture of a strong mineral acid and an alkanol having from 2 to 5 carbon atoms, said mixture having a mineral acid concentration of at least about 0.5 weight percent and an amount of alkanol effective to dissolve organic contaminates removed from the resin and said contact occurring for sufficient time to substantially restore the ion exchange capacity of the loaded resin.

4,988,738

PROCESS FOR THE PREPARATION OF BIFUNCTIONAL ANION EXCHANGE RESINS, NEW BIFUNCTIONAL ANION EXCHANGE RESINS AND USE THEREOF

Alfred Mitschker, Odenthal-Holz; Peter M. Lange, Leverkusen; Harold Heller, Cologne; Friedrich Werner, Roesrath-Forsbach; Hans-Karl Soest, Cologne, and Günter Siegers, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 30, 1989, Ser. No. 373,836

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824266

Int. Cl.[5] C08F 8/30, 12/08

U.S. Cl. 521—30 8 Claims

1. A process for the preparation of a bifunctional anion exchange resin by partial quaternization of a weakly basic anion exchanger containing tertiary amino groups which process comprises (a) partially loading the weakly basic anion exchanger with a strong acid and then (b) quaternizing the partially loaded anion exchanger by means of a customary alkylating agent.

4,988,739

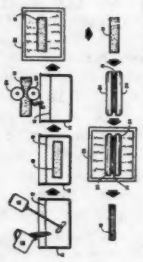
METHOD OF IMPROVING FOAM FIRE RESISTANCE THROUGH THE INTRODUCTION OF METAL OXIDES THEREINTO

Francis U. Hill, San Diego, Calif., assignor to Sorrento Engineering, Inc., National City, Calif.

Division of Ser. No. 373,900, Jun. 30, 1989, Pat. No. 4,935,452. This application Feb. 12, 1990, Ser. No. 479,281

Int. Cl.[5] C08J 9/40

U.S. Cl. 521—55 2 Claims



1. A flame resistance of open-cell polyimide foam product produced from the following method which comprises the steps of:

adding very finely divided metal oxide particles to water or a highly polar organic liquid to form a gel;

placing an open-cell synthetic resin foam product in said gel;

manipulating said foam product so as to substantially entirely fill said cells with gel;

removing said foam product; and

drying said foam product;

whereby metal oxide particles remain dispersed throughout said cells.

4,988,740

LOW DENSITY FOAMED THERMOPLASTIC ELASTOMERS

Timothy H. Walter, Wilmington, Del., and Thomas M. Pontiff, Gansevoort, N.Y., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 15, 1989, Ser. No. 366,555

Int. Cl.[5] C08J 9/14; C08L 67/00, 77/00

U.S. Cl. 521—138 8 Claims

1. A foamed thermoplastic elastomer having a substantially uniform cell structure which comprises a foamed thermoplastic multi-block copolymer elastomer having a closed cell structure and having a specific gravity of less than about 0.35, an energy return ratio greater than about 0.50 when compressed and released, as determined by the recommended method of ASTM Committee F08.54 on athletic footwear, said foam being prepared from a thermoplastic multi-block copolymer elastomer having a Shore D hardness of 25–75 and selected from the group consisting of (1) copolyetheresters, (2) copolyesteresters, (3) copolyetherimide esters and (4) copolyetheramides, said thermoplastic foam being prepared by mixing said multi-block copolymer elastomer at a temperature above its melting point to form a molten mass with a low-boiling liquid forming agent at a pressure sufficient to dissolve and/or disperse said foaming agent in said molten elastomer and extruding the resulting mixture through an orifice into a lower pressure zone whereupon substantially free and uniform foaming and expansion occur and the elastomer solidifies.

4,988,741

CONTROLLED RELEASE COMPOSITIONS AND USE

Judith Stein, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 27, 1989, Ser. No. 441,733

Int. Cl.[5] C08G 77/04, 77/06

U.S. Cl. 522—31 4 Claims

1. A UV curable controlled release composition comprising by weight,

(A) 100 parts of an epoxy silicone fluid consisting essentially of about 20 to about 100 condensed siloxy units which constitute about 84 to about 94 mole percent of diorganosiloxy units of the formula,

$$(R)_2SiO$$

where R is selected from the same or different $C_{(1-13)}$ monovalent organo radicals and 6 to about 16 mole of epoxy organosiloxy units of the formula,

$$R\ R^1SiO$$

where R^1 is a monovalent epoxy functional organic radical,

(B) from about 1 to about 35 parts of a cationically polymerizable styrene compound selected from the class consisting of α-methylstyrene compounds, p-substituted styrene compounds and mixtures thereof, and

(C) 0.1% to 2% by weight based on the weight of the UV curable control release composition of a photoactive aromatic onium salt.

4,988,742

TACKIFIED TERPOLYMER ADHESIVES

John D. Moon, Hastings; Margaret M. Sheridan, and Francis M. Stark, Jr., both of St. Paul, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 2, 1988, Ser. No. 238,901
Int. Cl.[5] C08F 2/46
U.S. Cl. 522—79 10 Claims

1. An acrylic terpolymer pressure-sensitive adhesive comprising

(a) from about 60 parts to about 95 parts of a photopolymerized polymer of monomers containing:

(1) from about 60 parts to about 96 parts of an alkyl acrylate monomer, the alkyl groups having an average of 6 to 12 carbon atoms,

(2) from about 2 parts of about 15 parts of a first polar copolymerizable monomer, said polar monomer being a strongly polar monomer, and

(3) from about 2 parts to about 25 parts of a second polar copolymerizable monomer selected from the group consisting of strongly polar and moderately polar monomers,

(b) correspondingly, from about 40 parts to about 5 parts of a hydrogenated rosin ester tackifying agent, and

(c) from about 0.01 to about 1 parts of a photoinitiator, wherein said adhesive has a lower glass transition temperature than would an identical acrylic terpolymer adhesive omitting said tackifying agent.

4,988,743

RADIATION SELF-SENSITIZED SILICONE POLYMERS

Richard P. Eckberg, Saratoga, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Mar. 21, 1988, Ser. No. 170,952
Int. Cl.[5] C08G 77/18; C08L 83/06; C08F 283/12
U.S. Cl. 522—99 13 Claims

1. A radiation curable silicone polymer comprising:

(a) acrylic or methacrylic functional units in sufficient number to crosslink and cure the polymer of the formula:

$$R_aR_b^1SiO_{(4-a-b)/s}$$

wherein R is hydrogen, $C_{(1-8)}$ substituted or unsubstituted hydrocarbon, R^1 is a substituted or unsubstituted acrylic or methacrylic functional hydrocarbon of from 3 to about 20 carbon atoms; a is 0, 1 or 2; b is 1, 2 or 3; and a+b is 1, 2 or 3; and

(b) benzoyl functional units in sufficient number to promote cure with exposure to ultraviolet radiation of the formula:

$$R_cR_d^2SiO_{(4-c-d)/2}$$

wherein R is given above, R^2 is a substituted or unsubstituted benzoyl functional hydrocarbon of from 7 to about 20 carbon atoms; c is 0, 1 or 2; d is 1, 2 or 3; and c+d is 1, 2 or 3.

4,988,744

PERFUME COMPOSITIONS PRODUCED BY SOL-GEL METHODS

Tohru Yamamoto, c/o Nakato Laboratory, Inc., 6, Ohshinohara, Yasu-cho, Yasu-gun, Shiga-ken, Japan

Division of Ser. No. 160,802, Feb. 26, 1988, Pat. No. 4,880,851.
This application Aug. 23, 1989, Ser. No. 397,386
Claims priority, application Japan, Feb. 4, 1987, 62-82279; Feb. 26, 1987, 62-43718; Feb. 27, 1987, 62-45462
Int. Cl.[5] B01D 13/02
U.S. Cl. 523—102 3 Claims

1. A perfume composition comprising a perfume substance encapsulated or clathrated in a matrix of conjugated polymer produced from an alkoxide, a silane coupling agent, and an organic monomer, which is obtained from a method comprising the steps of:

adding an acid catalyst for sol-gel methods to a reaction mixture comprising water; an alkoxide selected from the group consisting of metal alkoxides, phosphorus alkoxides, and tetraethoxysilane; a silane coupling agent selected from the group consisting of (γ-glycidoxypropyl)-trimethoxysilane, (γ-glycidoxypropyl)methyldiethoxysilane, β(3,4-epoxycyclohexyl)ethyltrimethoxysilane, vinyltrimethoxysilane, vinyltrichlorosilane, vinyltris(β-methoxyethoxy)silane, vinyltriacetoxysilane, (γ-methacryloxypropyl)trimethoxysilane, N-β-(N-vinylbenzylaminoethyl)-γ-aminopropyltrimethoxysilane.hydrochloride, γ-aminopropyltriethoxysilane, N-phenyl-γ-aminopropyltrimethoxysilane, γ-(2-aminoethyl)aminopropyltrimethoxysilane, γ-(2-aminoethyl)aminopropylmethyldimethoxysilane, γ-mercaptopropyltrimethoxysilane, mercaptopropylmethyldimethoxysilane, methyltrimethoxysilane, methyltriethoxysilane, hexamethyldisilazane, γ-anilinopropyltrimethoxysilane, γ-chloropropyltrimethoxysilane, γ-chloropropylmethyldimethoxysilane, methyltrichloromethylsilane, dimethyldichlorosilane, trimethylchlorosilane, and octadecyldimethyl-(3-(trimethoxysilyl)propyl)ammonium chloride; and a perfume substance; so as to cause the hydrolysis of said alkoxide and said silane coupling agent, forming a hydrolysate;

adding an organic monomer selected from the group consisting of dimethylformamide acrylic acid, methacrylic acid, acrylonitrile, styrene, methyl acrylate, ethyl acrylate, methyl methacrylate and ethyl methacrylate to the reaction mixture;

adding a base catalyst for sol-gel methods to the reaction mixture, and immediately thereafter irradiating the reaction mixture with a radiation source selected from the group consisting of ultraviolet light and an electron beam, so that the polycondensation of the hydrolysate occurs with the polymerization of said organic monomer to form a conjugated polymer, thereby encapsulating or clathrating said perfume substance in the matrix of said conjugated polymer.

4,988,745

ESTER HARDENERS FOR PHENOLIC RESIN BINDER SYSTEMS

S. Raja Iyer, Naperville, and Sudhir K. Trikha, Streamwood, both of Ill., assignors to Acme Resin Corporation, Westchester, Ill.

Filed Apr. 27, 1989, Ser. No. 344,215
Int. Cl.[5] C08K 3/36; C08L 61/10
U.S. Cl. 523—145 21 Claims

1. A hardener composition for alkaline phenolic resole resin binders which comprises a solution of a benzylic ether resole resin in an ester, said benzylic ether resole resin comprising from about 5 percent to about 40 percent by weight of the solution.

7. A binder composition which comprises an aqueous alkaline solution of a phenolic resole resin and a hardener for said phenolic resole resin wherein the hardener comprises a solution of a benzylic ether resole resin in an ester, said benzylic ether resole resin comprising from about 5 percent to about 40 percent by weight of the hardener.

4,988,746

FLAME RESISTANT STAPLE FIBER BLEND

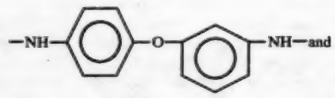
Makoto Tanaka, Toyonaka; Mutsuo Katsu, Iwakuni, and Tadashi Seki, Osaka, all of Japan, assignors to Teijin Limited, Osaka, Japan

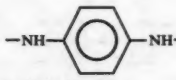
Filed Feb. 23, 1989, Ser. No. 314,384
Claims priority, application Japan, Feb. 26, 1988, 63-42300
Int. Cl.[5] C08J 5/00; C08L 77/00
U.S. Cl. 524—12 5 Claims

1. A flame resistant staple blend comprising:

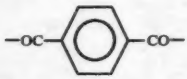
(A) 80 to 97 parts by weight of staple fibers comprising a m-aramide polymer material consisting of a mixture of a poly-m-phenyleneisophthalamide polymer with at least one additional aramide polymer comprising an acid component consisting of an aromatic dicarboxylic acid and an amine component consisting of 35 to 100 molar % of xylylene diamine and 0 to 65 molar % of an aromatic diamine different from the xylene diamine, and having a thermal shrinkage stress of 130 mg/denier or less at a temperature of about 350° C.; and

(B) 3 to 20 parts by weight of staple fibers comprising a p-aramide copolymer comprising two types of recurring units of the formulae:





and recurring units of the formula:



having a higher flame resistance than that of the m-aramide staple fibers (A), and evenly blended with the m-aramide staple fibers (A).

4,988,747

PROCESS FOR PREPARING A BITUMINOUS BINDER MODIFIED WITH PLASTICS FOR BUILDING MATERIALS

Erich Strommer, Schattendorf, Austria, assignor to Novophalt Overseas S.A., Luxembourg

Filed Jul. 5, 1988, Ser. No. 215,038

Int. Cl.[5] C08J *3/20*; C08L *95/00*

U.S. Cl. 524—59 **37 Claims**

1. A process for the production of a bituminous binder comprising:

combining molten bitumen with a thermoplastic material having a molecular weight greater than that of said bitumen to form a mixture; and

mixing the bitumen and thermoplastic material mixture to effect homogenization by driving the mixture through a narrow gap having a width less than 3 mm using an amount of kinetic energy corresponding to the difference between about the treatment temperature of the mixture and a temperature sufficient to cause the thermoplastic material to form reactive fragments which react to form a partially crystalline structure different than that of said thermoplastic material.

4,988,748

FLAME-RESISTANT THERMOPLASTIC POLYCARBONATE MOLDING COMPOUNDS

Karl Fuhr, Krefeld; Friedemann Müller, Neuss; Karl-Heinz Ott; Hans-Dieter Block, both of Leverkusen; Bernd Urbanneck, Moenchengladbach, and Werner Ballas, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,078

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824356

Int. Cl.[5] C08K *3/26, 3/34, 5/09, 5/52*

U.S. Cl. 524—141 **10 Claims**

1. This invention relates to thermoplastic molding compounds containing

(A) 40 to 90 parts by weight of a thermoplastic aromatic polycarbonate,

(B) 10 to 50 parts by weight of a thermoplastic copolymer of 50 to 95% by weight styrene, α-methyl styrene, nucleus-alkylated styrene, halostyrene or mixtures thereof and 5 to 50% by weight acrylonitrile, methacrylonitrile, alkyl acrylate, alkyl methacrylate, maleic anhydride, N-substituted maleic imide, vinyl acetate or mixtures thereof,

(C) 0 to 25 parts by weight of a graft polymer produced from

(C.1) 5 to 90 parts by weight of a mixture of:

(C1.1) 50 to 95% by weight styrene, α-methyl styrene, halostyrene, nucleus-alkylated styrene, methyl methacrylate or mixtures thereof and

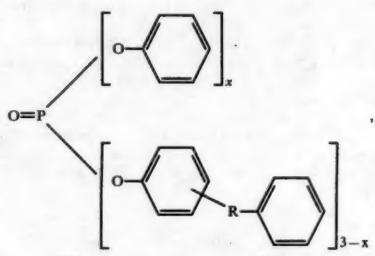
(C.1.2) 5 to 50% by weight (meth) acrylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleic imide or mixtures thereof on

(C.2) 10 to 95 parts by weight of a rubber having a glass temperature T_G of ≦10° C.,

(D) 1 to 25 parts by weight of a phosphorus compound, based on 100 parts by weight of the mixture of (A)+(B) and, optionally, (C),

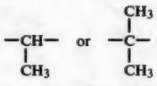
(E) 0.05 to 5.0 parts by weight, based on 100 parts by weight (A)+(B) and, optionally, (C) of a tetrafluoroethylene polymer having mean particle sizes of 0.05 to 20 μm and a density of 1.2 to 1.9 g/m³,

characterized in that they contain as the phosphorus compounds (D) those corresponding to formula (I)



(I)

in which R is a direct bond, a —CH_2—,



group and x=0, 1 or 2 and the aromatic parts may also be alkyl-substituted.

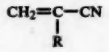
4,988,749

STABILIZATION OF NITRILE POLYMERS

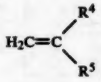
Vincent A. Aliberti, Wilbraham, and James K. Stevens, Belchertown, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 27, 1989, Ser. No. 441,598
Int. Cl.[5] C08L 33/00
U.S. Cl. 524—159 8 Claims

1. A nitrile polymer molding composition which comprises from 40% to 80% by weight of a nitrile monomer having the formula:



wherein R is hydrogen, lower alkyl having from 1 to 4 carbon atoms or halogen; and a monovinylidene aromatic hydrocarbon monomer having the formula:



wherein R^4 is hydrogen, chlorine or methyl and R^5 is an aryl group of 6 to 10 carbon atoms, and

(a) from about 0.5 to about 1.0% by weight based on the weight of the molding composition of at least one sulfur containing stabilizer selected from the group consisting of:
thioglycerol
glycerol dimercaptoacetate
thiodiethanol
t-dodecyl mercaptan; and
dibenzyl disulfide
and (b) from about 0.5 to aoout 7.0% by weight based on the weight of the molding composition of at least one sulfur containing plasticizer selected from the group consisting of:
N-aryl sulfonamides
N-alkyl aryl sulfonamides; and
N-toluene sulfonamide-formaldehyde
wherein the alkyl group contains from 2 to 4 carbon atoms and the aryl group contains from 6 to 9 carbon atoms.

4,988,750

NON-TOXIC STABILIZER FOR HALOGENATED POLYMER

Max Buschhoff, Luenen; Hans Plum, Hamm, and Karl-Heinz Mueller, Werne, all of Fed. Rep. of Germany, assignors to Schering AG, Berlin and Bergkamen, Fed. Rep. of Germany

Continuation of Ser. No. 726,954, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 587,865, Mar. 12, 1984, abandoned, which is a continuation of Ser. No. 524,466, Aug. 18, 1983, abandoned, which is a continuation of Ser. No. 435,609, Oct. 19, 1982, abandoned, which is a continuation of Ser. No. 284,196, Jul. 17, 1981, abandoned. This application Sep. 11, 1986, Ser. No. 907,127
Int. Cl.[5] C08K 5/58
U.S. Cl. 524—181 7 Claims

1. A non-toxic stabilizer mixture for a molding compound comprising a halogenated polymer, said stabilizer mixture comprising about 40 percent by weight of a didodecyltinbis-thioglycolic acid ester of the formula

$$(n\text{-}C_{12}H_{25})_2Sn(SCH_2COOR)_2$$

and about 60 percent by weight of a dodecyltin-tris-thioglycolic acid ester of the formula

$$n\text{-}C_{12}H_{25}Sn(SCH_2COOR)_3,$$

wherein R is straight-chain or branched-chain alkyl having 8 carbon atoms.

5. A stabilized molding compound comprising a halogenated polymer and from 0.1–3 percent, by weight of said polymer, of a mixture as in claim 1 admixed with said polymer.

4,988,751

HALOGENATED VINYL POLYMER COMPOSITION AND METHOD FOR STABILIZING HALOGENATED VINYL POLYMER COMPOSITION CONTAINING SMOKE RETARDANTS

Scott R. Chambers, Charlotte, N.C., and Michael R. Croce, Brooklyn, N.Y., assignors to Witco Corporation, New York, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,038
Int. Cl.[5] C08K 5/57, 5/58
U.S. Cl. 524—181 36 Claims

1. A halogen containing polymer composition substantially resistant to staining comprising a halogenated vinyl polymer, a smoke retardant amount of at least one molybdenum smoke retardant and an effective stabilizing amount of an organotin stabilizer comprising a mixture of organotin compounds, said organotin stabilizer having an overall ratio of sulfur to tin of not more than 1.7 gram atoms of sulfur per gram atom of tin.

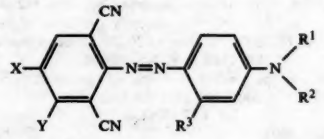
4,988,752

COLORED THERMOPLASTIC RESIN COMPOSITION

Rainer Hamprecht, Odenthal-Blecher; Michael Kressner, Leichlingen, and Georg Pape, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 31, 1989, Ser. No. 359,247
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1988, 3820191
Int. Cl.[5] C08J 3/20; C08K 5/23; C08L 25/04, 33/12
U.S. Cl. 524—190 8 Claims

1. A process for the coloration in the mass of a thermoplastic selected from the group consisting of a styrene/acrylonitrile copolymer, styrene/butadiene copolymer, styrene/α-methylstyrene copolymer, polystyrene, a poly(meth)acrylate and polycarbonate, comprising mixing a dyestuff with granules of the plastic, extruding this mixture in strands, again granulating and converting them into the desired final form by calendering, pressing, extruding or injection molding, the dyestuffs being of the formula



I

in which
X denotes C_1–C_6-alkyl, CF_3, Cl or Br,
Y denotes H, CH_3 or Cl,
R^1 denotes C_1–C_4-alkyl or C_1–C_4-alkoxy-C_2–C_4-alkyl,
R^2 denotes C_1–C_4-alkyl, C_1–C_4-alkoxy-C_2–C_4-alkyl and
R^3 denotes H or CH_3.

4,988,753

VULCANIZABLE BINDER DISPERSION COMPOSITION

Helmut Rullmann, Frankfurt am Main; Adolf Zellner, Mörfelden-Walldorf, and Manfred Gebhard, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 207,258

Claims priority, application Fed. Rep. of Germany, Jun. 17, 1987, 3720218

Int. Cl.[5] C08K *5/32;* C08L *23/34, 27/08*

U.S. Cl. 524—260 4 Claims

1. A bonding composition for bonding natural and synthetic elastomers to metallic and nonmetallic substrates under vulcanizing conditions said bonding composition in an aqueous dispersion consisting essentially of:

100 parts by weight organic polymeric film-forming substance which is a mixture of chlorosulfonated polyethylene and vinyl chloride/vinylidene chloride/acrylic acid copolymer;

5 to 100 parts by weight organic polynitroso compound;

5 to 100 parts by weight coreactive compound selected from the group consisting of diallyl acrylamide and phenylene bis-maleic acid imide;

0 to 200 parts by weight adhesion promoter; and

which dispersion also contains as optional constituents conventional promoters, fillers and processing aids.

4,988,754

STABILIZED COMPOSITIONS

Robert Q. Kluttz, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 27, 1989, Ser. No. 373,317

Int. Cl.[5] C08K *5/08*

U.S. Cl. 524—358 19 Claims

1. A stabilized composition comprising:

a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon, wherein the polymer is represented by the repeating formula

$$-CO-(-CH_2-CH_2-)_x-CO-G-_y$$

wherein G is a moiety of an ethylenically unsaturated hydrocarbon of at least 3 carbon atoms polymerized through the ethylenic unsaturation and the ratio of y:x is no more than about 0.5; and

a stabilizing quantity of an alkylated benzoquinone, wherein the benzoquinone is substituted with at least one secondary or tertiary alkyl group on a carbon atom ortho to a quinone carbonyl group.

4,988,755

PASSIVATED RARE EARTH MAGNET OR MAGNETIC MATERIAL COMPOSITIONS

E. Douglas Dickens, Jr., Richfield, and Anthony M. Mazany, Akron, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 132,890, Dec. 14, 1987, Pat. No. 4,876,305, and a continuation-in-part of Ser. No. 313,662, Feb. 21, 1989, Pat. No. 4,869,964, which is a division of Ser. No. 132,890, Dec. 14, 1987, Pat. No. 4,876,305. This application Sep. 19, 1989, Ser. No. 409,538

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.[5] C08K *3/00*

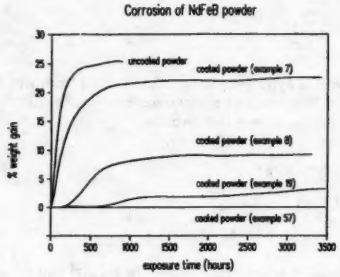
U.S. Cl. 524—401 96 Claims

1. A passivated rare earth magnet composition, comprising:

particles of at least one rare earth magnet material,

a passivating agent, said passivating agent being an (A) oxidation resistant composition, or an (B) corrosion inhibitor, or mixtures of (A) and (B), or layers of (A) and (B) in any order, said passivating agent attached to and coating said at least one rare earth magnet material, the total amount of said passivating agent being 20 percent or less by weight based upon the total weight of said rare earth magnet material and said passivating agent, and

a binder adhering said coated particles of said at least one rare earth magnet material together and forming a passivated rare earth magnet composition, said binder comprising a thermoset polymer, a thermoplastic polymer, an elastomer, a reaction injection molding binder, or combinations thereof, the amount of said binder being from about 2 percent to about 60 percent by volume based upon the total volume of said rare earth magnetic material, said passivating agent, and said binder.



4,988,756

INHIBITION OF POLY(ARYLENE SULFIDE) RESIN INDUCED METAL CORROSION

Van C. Vives, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 201,141, Jun. 2, 1988, Pat. No. 4,916,179. This application Dec. 18, 1989, Ser. No. 451,895

Int. Cl.[5] C08K *3/30*

U.S. Cl. 524—405 21 Claims

12. An admixture comprising poly(arylene sulfide) resin and a corrosion inhibiting amount of lithium sulfite and at least one compound selected from the group consisting of alkali metal or alkaline earth metal carbonates, alkali metal or alkaline earth metal borates, or mixtures of said carbonates and borates.

4,988,757

SYNTHETIC ALKALI METAL ALUMINOSILICATES AND USE IN RUBBER

Satish K. Wason, Macon, Ga., assignor to J. M. Huber Corporation, Rumson, N.J.

Division of Ser. No. 297,738, Jan. 17, 1989, which is a continuation of Ser. No. 875,120, Jun. 17, 1986, and a continuation-in-part of Ser. No. 116,805, Nov. 3, 1987, Pat. No. 4,812,299. This application May 31, 1990, Ser. No. 531,485

Int. Cl.[5] C08K *3/34*

U.S. Cl. 524—447 12 Claims

1. A rubber composition containing an effective amount of a filler comprising an alkali metal aluminosilicate having a composition in terms of mole ratio of oxides as follows:

$$xM_2O:Al_2O_3:ySiO_2:zH_2O$$

where x is the number of moles of alkali metal oxide, M is an alkali metal, y is the number of moles of SiO_2 associated with the alkali metal aluminosilicate compositions, and z is the numbr of moles of bound water, and having the morphology of rimmed particles as depicted in any one of TEM Figures 18–23.

4,988,758

Takeshi Fukuda; Motvo Fukushima; Kunio Itah and Hironao Fujiki all of Gunam, Japan

Continuation-in-part of Ser. No. 157,120, Feb. 10, 1988, abandoned, which is a continuation of Ser. No. 3,946, Jan. 16, 1987

This application Jul. 21, 1988, Ser. No. 222,212

Int Cl.[4] C08L *83/07;* C08K *3/36*

U.S. Cl. 524—492 8 Claims

1. A curable fluorine-substituted organopolysiloxane composition which comprises, in dmixture

(A) a polyorganosiloxane having a viscosity of at least 400 centipoise at 25 °C and a molecular structure represented by the general formula

$$X^1—O—(SiR_2—O)_n—(SiRR_f—O)_m—X^2,$$

or

$$[X^1—O—(SiR_2—O)_n—(SiRR_f—O)_m]_pSiR_{4-p},$$

in which R is a monovalent hydrocarbon group selected from the class consisting of methyl, vinyl and phenyl groups, R_f is a fluorinated alkyl group having 3 to 10 carbon atoms, n is zero or a positive integer, m is a positive integer with the proviso that m:(m+n) is in the range from 0.005 to 1, p is 2, 3 or 4, X^1 is a vinyl dimethyl siloxy-substituted silyl group represented by the general formula

$$Vi—SiMe_2—(O—SiMe_2—)_r,$$

in which Vi is a vinyl group, Me is a methyl group and r is a positive integer in the range from 1 to 30, and X^2 is a hydrogen atom or X^1; and

(B) an organic peroxide curing agent in an amount sufficient to cure the component (A).

4,988,759

Patent Not Issued For This Number

4,988,760

SOLUBLE CROSSLINKABLE ACRYLATE COPOLYMER, PROCESSES FOR ITS PREPARATION AND COATING AGENTS BASED UPON THE ACRYLATE COPOLYMER

Werner Jung, Ascheberg, and Axel Sievers, Münster, both of Fed. Rep. of Germany, assignors to BASF Lacke & Farben Aktiengesellschaft, Münster, Fed. Rep. of Germany

Continuation of Ser. No. 57,921, May 29, 1987, abandoned. This application Dec. 5, 1989, Ser. No. 449,295

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534874

Int. Cl.[5] C08L *39/00*

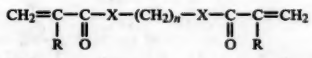
U.S. Cl. 524—555 15 Claims

1. A coating composition comprised of a primary binder curable by a catalyst, and containing a soluble addition copolymer obtained by copolymerization of monomers (a1), (a2) and (a3) and wherein:

(a1) is a monomer comprising 5 to 30% by weight of the total monomers having at least two polymerizable olefinically unsaturated bonds and is selected from:

(1) divinyl benzene;

(2) a compound formula:



wherein

R represents H or methyl;

X represents O or NR′, where R′ is H, alkyl or aryl, and n is 2 to 8;

(3) the reaction product of a carboxylic acid compound having a polymerizable, olefinically unsaturated double bond and glycidyl acrylate or glycidyl methacrylate;

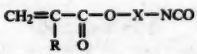
(4) the reaction product of an unsaturated mono- or polycarboxylic acid esterified with an unsaturated alcohol;

(5) the reaction product of a polyisocyanate and an unsaturated alcohol or amine, or

(6) the diester of polyethylene glycol or polypropylene glycol having a mean molecular weight of less than 1500 and acrylic or methacrylic acid;

(a2) is a monomer comprising 5 to 50% by weight of the total monomers, has a cross-linkable isocyanate, activated ester or amide, or glycidyl group, and is selected from:

(1) a vinyl isocyanate or an isocyanatoalkyl ester of an unsaturated carboxylic acid of the formula:



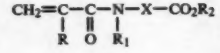
wherein

R represents H, $—CH_3$ or $—C_2H_5$ and

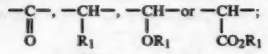
X represents $—(CH_2)—_{1-12}$;

(2) the reaction product of a diisocyanate with a monomer containing active hydrogens;

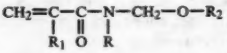
(3) a monomer of the formula:



wherein
R represents H or methyl;
R_1 represents H, alkyl or aryl;
R_2 represents alkyl, and
X represents



(4) an alkoxymethacrylamide or alkoxymethylmethacrylamide of the formula:



wherein
R_1 represents H or methyl;
R_2 represents H or alkyl; and
R represents H, alkyl or aryl; or
(5) a copolymer containing glycidyl groups; and
(a3) comprises 20 to 92% by weight of the total monomers and is a further monomer having a polymerizable, olefinically unsaturated double bond;
a cross-linker suitable for cross-linking a primary binder; an organic solvent and a pigment.

4,988,761

PROCESS FOR PRODUCING A LOW WATER CONTENT PVA HYDROGEL

Yoshito Ikada, and Shokyu Gen, both of Uji, Japan, assignors to Dow Corning K.K., Tokyo; Bio-Materials Univers Co., Kyoto and Kyocera Corp., Kyota, all of, Japan

Filed Apr. 26, 1989, Ser. No. 343,468
Claims priority, application Japan, Sep. 22, 1988, 63-236572
Int. Cl.[5] C08L *29/04*
U.S. Cl. 524—557 **7 Claims**

1. A process of producing polyvinyl alcohol hydrogel comprising (A) subjecting a solution in a mixture of water and water-miscible organic solvent of polyvinyl alcohol with a polymerization degree over 1200, to a temperature below −5° C. so that the polyvinyl alcohol is gelated, (B) drying said hydrogel at an elevated temperature so that it contains less than about 3% by weight of water, (C) subjecting said hydrogel to a temperature higher than 100° C. for a time sufficient to reduce the size of the PVA crystals in said hydrogel, (D) saturating the resulting hydrogel with water, whereby polyvinyl alcohol hydrogel with a saturated water content lower than 40 wt % is obtained.

4,988,762

AQUEOUS COATING COMPOSITIONS

Gerardus C. Overbeek, and Martinus P. J. Heuts, both of Holland, Netherlands, assignors to ICI Resins b.v., Waalwijk, Netherlands

Filed May 15, 1989, Ser. No. 351,461
Claims priority, application United Kingdom, May 13, 1988, 8811436
Int. Cl.[5] C08F *8/32*
U.S. Cl. 524—839 **20 Claims**

1. An aqueous selfcrosslinkable coating composition which comprises an aqueous dispersion comprising at least one vinyl polymer, wherein the polymer system constituting said at least one vinyl polymer has chain-pendant amine functional groups and chain-pendant ketone or aldehyde carbonyl functional groups to provide a selfcrosslinking reaction during and/or after coating formation from the composition.

4,988,763

CATALYZED BULK PROCESS FOR PRODUCING CYCLIC ESTER-MODIFIED ACRYLIC POLYMERS

Lisa M. Kessler, Milwaukee County; Kevin M. Scholsky, and Robert W. Stackman, both of Racine County, all of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Apr. 26, 1988, Ser. No. 186,515
Int. Cl.[5] C08E *8/00*
U.S. Cl. 525—61 **7 Claims**

1. Bulk process for reacting at a temperature of from 100°–300° C. for a period of from less than one minute to six

hours in the presence of a Lewis acid catalyst selected from the group consisting of BF_3.etherate, tetrabutyl-titanate, zinc chloride, stannous chloride, aluminum isoproperoxide, zinc acetate and mixtures thereof, a polymer component which is a member of the group consisting of a polyacrylate containing hydroxyl alkyl moieties, a poly(vinyl alcohol) containing reactive hydroxyl groups and mixtures thereof, with a cyclic ester component having the formula

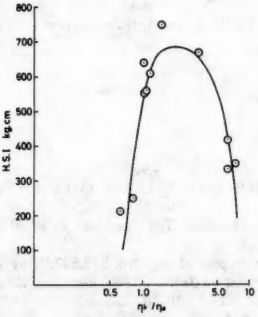
wherein n is at least one, at least n+1R are hydrogen, and the remainder of the R's are hydrogen, alkyl, cycloalkyl, alkoxy or single ring aromatic hydrocarbon radicals; said cyclic ester component being present in an amount of from 0.1 to 10 moles per mole of hydroxyl group on said polymer component and being selected to be substantially miscible with the polymer component at the conditions of the reaction, said process being carried out without use of a solvent.

4,988,764

IMPACT-RESISTANT POLYPROPYLENE RESIN COMPOSITIONS

Takeyoshi Nishio, Okazaki; Toshio Yokoi; Takao Nomura, both of Toyota; Kouhei Ueno, Sakai; Tomohiko Akagawa, Sakai; Ikunori Sakai, Sakai, and Yasufumi Takasaki, Sakai, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 248,192, Sep. 23, 1988, abandoned. This application Mar. 27, 1990, Ser. No. 500,119
Claims priority, application Japan, Sep. 29, 1987, 62-245253
Int. Cl.[5] C08L *77/00*
U.S. Cl. 525—66 **3 Claims**



1. An impact-resistant polypropylene resin composition obtained by melt mixing:

(a) 80–55 parts by weight of a modified polypropylene obtained by grafting a crystalline propylene-ethylene block copolymer having a melt index of 0.3–30 g/10 min and an ethylene content of 3–15% by weight with 0.03–5 parts by weight, base on 100 parts by weight of the crystalline propylene-ethylene block copolymer, of an unsaturated carboxylic acid or its derivative, or a crystalline polypropylene containing at least 5% by weight of the modified polypropylene,

(b) 20–45 parts by weight of a polyamide having a melt viscosity η_b 1.0–5.0 times the melt viscosity η_a of the component (a) at the shear rate when the melt mixing of the components (a), (b) and (c) is effected, and

(c) 2–60 parts by weight, based on 100 parts by weight of the total of the components (a) and (b), of a modified ethylene-α-olefin copolymer rubber obtained by grafting an ethylene-α-olefin copolymer rubber having a Mooney viscosity ML_{1-4}(100° C.) of 10–150 and an ethylene content of 30∝90% by weight with 0.03–5 parts by weight, based on 100 parts by weight of the ethylene-α-olefin copolymer rubber, of an unsaturated carboxylic acid or its derivative.

4,988,765

HIGH IMPACT RESISTANT BLENDS OF THERMOPLASTIC POLYAMIDES AND MODIFIED DIBLOCK COPOLYMERS

Lorelle A. Pottick, and Carl L. Willis, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 140,007, Dec. 31, 1987, abandoned, which is a continuation-in-part of Ser. No. 766,215, Aug. 16, 1985, Pat. No. 4,783,503. This application Dec. 22, 1988, Ser. No. 288,366
Int. Cl.[5] C08L *53/00*
U.S. Cl. 525—92 **57 Claims**

1. A super-toughened multiphase thermoplastic composition comprising:

(a) one phase containing a thermoplastic α,ω-polyamide; and

(b) at least one other phase containing at least one functionalized, selectively hydrogenated non-network forming block copolymer, each block copolymer molecule comprising at least one hydrogenated conjugated diolefin block and at least one monoalkenyl arene polymer block to which has been grated on the average an effective amount of carboxyl functional groups for super-toughening the multiphase thermoplastic composition, the block copolymer molecule having substantially all of the carboxyl functional groups grafted to the monoalkenyl arene polymer block,

(c) the phase containing a thermoplastic α,ω-polyamide being present in a weight ratio of about 50:50 up to about 80:20 relative to the phase containing the block copolymer.

4,988,766

POLYMERS PREPARED BY POLYMERIZING ALPHA, BETA-ETHYLENICALLY UNSATURATED ACIDS AND EPOXY COMPOUNDS AND CROSSLINKED PRODUCTS THEREFROM

Suryya K. Das, Pittsburgh; Samuel Porter, Jr., Natrona Heights, and Wayne H. Tyger, New Kensington, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 49,236, May 13, 1987, Pat. No. 4,818,796. This application Sep. 20, 1988, Ser. No. 246,603

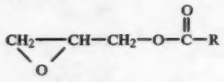
Int. Cl.[5] C08F *18/02, 20/26*

U.S. Cl. 525—123 9 Claims

1. A curable coating composition comprising a hydroxyl-containing polymer and a curing agent which is reactive with the hydroxyl group in the polymer and is present in an amount sufficient to form a cured product; said hydroxyl-containing polymer having a hydroxyl number of at least 130 and a weight average molecular weight of less than 15,000 which is curable with a curing agent reactive with active hydrogens in the polymer and which is prepared by heating in the presence of a free radical initiator, the following reactive ingredients:

(A) a polymerizable alpha, beta-ethylenically unsaturated carboxylic acid and

(B) an epoxy compound containing at least 5 carbon atoms which is not addition polymerizable with (A) having the following structure:



where R is a tertiary aliphatic hydrocarbon group of 4 to 26 carbon atoms;

(A) and (B) amounting to at least 80 percent by weight of the reactive ingredients and the equivalent ratio of acid in (A) to epoxy in (B) is at least 1 to 1.

4,988,767

THERMOSETTING POWDER COATING COMPOSITION CONTAINING A MIXTURE OF LOW TG AND HIGH TG POLYMERS WITH ACID FUNCTIONAL GROUPS

Paul H. Pettit, Jr., Wexford, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 18, 1989, Ser. No. 408,856

Int. Cl.[5] C08L *33/02*

U.S. Cl. 525—194 8 Claims

1. A powder coating composition comprising:

(a) about 1 percent to about 25 percent by weight based on the weight of resin solids of a first acid group-containing acrylic polymer having a Tg in the range of about −20° C. to about 30° C.;

(b) about 40 percent to about 75 percent by weight based on weight of resin solids of a second acid group-containing acrylic polymer having a Tg in the range of about 40° C. to about 100° C.; and

(c) a beta-hydroxyalkylamide curing agent capable of reacting with acid groups in (a) and (b) to form a crosslinked product.

4,988,768

POLYVINYL CHLORIDE PLASTISOL BASED CURABLE COMPOSITION

Edward F. Gola, Allison Park, Pa., and Umesh C. Desai, Troy, Mich., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 27, 1988, Ser. No. 290,328

Int. Cl.[5] C08K *5/12, 27/06, 47/00*

U.S. Cl. 525—195 9 Claims

1. A curable composition comprising:

(a) a vinyl chloride plastisol,

(b) a diene acrylonitrile copolymer, containing activated vinyl groups which are capable of undergoing free radical intiated polymerization carried out either by use of heat or ultraviolet light or electron beam in the presence of a free radical initiator and organometallic accelerator combination, and

(c) an organometallic accelerator and free-radical initiator combination adapted to promote cure of the fusing plastisol composition, the organometallic accelerator being present in an amount ranging from about 0.1 percent to about 1.5 percent and the free radical initiator being present in an amount ranging from about 0.15 percent to about 1.5 percent, the percentages based on the total weight of the composition, with the proviso that for every 100 parts of vinyl chloride plastisol there are present from about 9 parts to about 16 parts of diene acrylonitrile copolymer containing activated vinyl groups.

4,988,769

REACTIVE POLYVINYL CHLORIDE AND POLYMER PRODUCTS MADE THEREFROM

Zaev Sharaby, South Euclid, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 276,175, Nov. 25, 1988, Pat. No. 4,871,801. This application Sep. 1, 1989, Ser. No. 402,201

Int. Cl.[5] C08L *37/00, 41/00*

U.S. Cl. 525—208 8 Claims

1. A reactive copolymer composition consisting of the reaction product of:

I. a hydroxyl containing vinyl halide base polymer comprising the reaction product of:

(a) a vinyl halide monomer; and

(b) at least 1 to 49% of one other ehtylenically unsaturated monomer having at least one pendant hydroxyl function group, and wherein said vinyl halide monomer is present in the amount of about 51 to 99 percent by weight of the base polymer composition; and

II. a cyclid polyanhydride functionalizing agent, the reaction occurring between the hydroxyl group son the base polymer and a cyclic anhydride group(s) on the functionalizing agent, wherein said functionalizing agent after bonding onto the base polymer has free cyclic anhydride group(s) available for further reaction.

4,988,770

FUNCTIONALIZED ELASTOMERIC POLYMER PRODUCTION

Pui K. Wong, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 349,547, May 9, 1989. This application Jul. 27, 1990, Ser. No. 558,369

Int. Cl.[5] C08F *287/00, 279/02, 255/06*

U.S. Cl. 525—244 11 Claims

1. A process for preparing a heat-curable, crosslinkable, elastomeric polymer which comprises contacting an elastomeric polymer having at least two pendant carboxylate groups with an arylcyclobutene compound of the formula

Y—R—Z

where Y is halo or sulfonic ester, R is alkylene of up to 4 carbon atoms, and Z is an arylcyclobutene group, in substantially neutral liquid phase solution in a polar organic reaction diluent.

4,988,771

GRAFT COPOLYMER HAVING DISPERSION STABILIZING EFFECT, A PROCESS FOR PRODUCING THE SAME, AND A PROCESS OF EMULSION POLYMERIZATION USING THE SAME

Fumikatsu Takeuchi; Tsutomu Takeuchi; Noriyuki Osaka; Yoichi Takizawa, and Susumu Kawase, all of Sayama, Japan, assignors to Soken Kagaku Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 66,813, Jun. 25, 1987, Pat. No. 4,916,191. This application Sep. 26, 1989, Ser. No. 412,909

Claims priority, application Japan, Jul. 1, 1986, 61-154845

Int. Cl.[5] C08F *259/08, 265/02, 291/00*

U.S. Cl. 525—276 6 Claims

1. In a graft copolymer of:

(1) a polymerizable macromonomer having a single ethylenical unsaturation at its terminus and having a molecular weight of 1,000 to 100,000, the polymeric portion of the macromonomer having been produced by radical polymerization of an ethylenically unsaturated monomer, and

(2) a copolymerizable comonomer having an ethylenical unsaturation, wherein the polymeric backbones of the graft copolymer are comprised of polymerized units of the macromonomer and the copolymerizable comonomer through their ethylenical unsaturation and the linear polymeric side chains of the graft copolymer are comprised of the remaining portion of the macromonomer other than its ethylenical unsaturation, the improvement wherein the copolymerizable comonomer comprises:

(a) a copolymerizable comonomer having an ethylenical unsaturation and having a fluorinated substituent; and

(b) a copolymerizable comonomer having an ethylenical unsaturation and having a hydrophilic substituent comprising a hydrophilic group selected from the group consisting of a carboxylic group, a salt thereof, a sulfonic group and a salt thereof,

the total means molecular weight of said graft copolymer being at least 5,000 and said graft copolymer being capable of stabilizing a monomer in emulsion polymerization of the monomer.

4,988,772

POLYALKYLVINYL ETHER/POLYALKYLOXAZOLINE COPOLYMERS, PROCESSES FOR MAKING, AND USES

Judy S. Riffle, and Gurudus D. Sinai-Zingde, both of Blacksburg, Va., assignors to Virginia Tech Intellectual Properties, Inc., Blacksburg, Va.

Filed May 23, 1989, Ser. No. 355,710

Int. Cl.[5] C08F *216/12*

U.S. Cl. 525—328.9 5 Claims

1. Copolymers of a polyalkylvinyl ether and a poly(2-alkyl-2-oxazoline).

4,988,773

HOMOPOLYMERS OR BLOCK COPOLYMERS OF VINYLAROMATICS AND/OR DIENES WITH AMMONIUM GROUPS, AND PREPARATION OF SAME

Klaus Bronstert, Carlsberg, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 46,146, May 5, 1987, abandoned. This application Nov. 21, 1989, Ser. No. 437,783

Int. Cl.[5] C08F *8/32*

U.S. Cl. 525—332.9 8 Claims

1. A salt of a homopolymer or block copolymer of a vinylaromatic and/or a diene which contains end groups of the formula: [—NH—(A)$_x$—NR^1R^2 .H_mY]NHl13 A—NR^1R^2 where A is a substituted or unsubstituted methylene bridge of 1 to 12 CH_2 groups, a cycloalkiphatic bridge or a phenylene bridge, R^1 and R^2 are each hydrogen, aliphatic or aromatic radicals or a bridge of 3 to 12 carbon members which may be substituted by aliphatic or aromatic radicals, as obtained by anionic polymerization of vinylaromatic and/or diene monomers, reacting the so obtained alkali-metallized (living) polymer with an amine providing the structure, —N-H—A—NR^1R^2, hydrolyzing, and reacting with an acid selected from the group consisting of HCl, HBr, HI, $HC10_4$, $HBr0_4$, H_2SO_4, H_2SO_3, H_3PO_4, $H_4P_20_7$, polyphosphoric acids, H_3PO_3, H_2Se0_4, and H_3As0_4.

4,988,774

CYANO-CONTAINING POLYMERS

Rudolf Fauss, Cologne; Mark Seidler, Leverkusen; Joseph W. Witle, deceased, late of Haferkamp; Margarethe H. Witte, heir; Karin Witte, heir, both of Cologne, and Klaus G. Witte, heir, Berlin, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 231,739, Aug. 12, 1988. This application Jul. 2, 1990, Ser. No. 547,568

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3728927

Int. Cl.[5] C08F *8/30*

U.S. Cl. 525—340 17 Claims

1. A process for preparing cyano-containing polymers, comprising reacting starting polymers having isolated, non-activated double bonds with hydrogen cyanide in the presence of catalysts of the formula

$$Ni[P(OR^1)_3]_{n'}$$

in which

R^1 stands for alkyl or aryl and

n denotes the number 3 or 4,

and in the presence of cocatalysts of the formula

$$AlR^2_{3-m}Hal_m$$

in which

R^2 stands for hydrogen, alkyl or cyano,

Hal stands for chlorine, bormine or cyano and

m denotes the number 0, 1, 2 or 3,

in inert organic solvents at a temperature of 35° to 100° C.

4,988,775

DICARBOXYLATE-CAPPED POLYPHENYLENE ETHER WITH TRIMELLITIC ACID ANHYDRIDE SALICYLATE ESTER

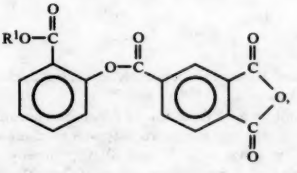
Timothy M. Sivavec, and Sharon J. McCormick, both of Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 5, 1990, Ser. No. 474,880

Int. Cl.[5] C08G *65/48*

U.S. Cl. 525—397 14 Claims

1. A dicarboxylate-capped polyphenylene ether composition prepared by melt blending, with application of vacuum, at least one polyphenylene ether with at least one trimellitic acid anhydride salicylate ester of the formula



(I)

wherein R^1 is C_{1-6} alkyl or a C_{6-10} aromatic hydrocarbon radical.

4,988,776

POLYMER COMPOSITION ON THE BASIS OF POLYMER AND A POLYESTER AMIDE

Bindert K. Vriesema, Sittard, Netherlands, assignor to Stamicarbon B. V., Geleen, Netherlands

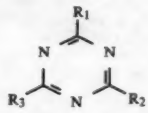
Filed Dec. 27, 1989, Ser. No. 457,560

Claims priority, application Netherlands, Dec. 28, 1988, 8803181

Int. Cl.[5] C08F 283/04; C08G 69/48; C08L 67/00

U.S. Cl. 525—425 12 Claims

1. Melt-processable aromatic (co)polymer composition, comprises a blend of a liquid crystalline polymer and a polyesteramide, characterized in that the composition contains 1–99 wt. % of one or more polyesteramides, derived from units, capable of forming a liquid crystalline polymer, and from one or more triazine units according to formula (I):



where R_1 is an amino-group, R_2 and R_3 is an (alkyl)carboxyl group, an (alkyl)hydroxy group and/or an amino group.

4,988,777

REDUCTION OF ACIDITY OF POLYESTERS BY MELT REACTION ENDCAPPING WITH ENEAMINES OR SCHIFF BASES

William L. Hergenrother, Akron, and John M. Doshak, Mogadore, both of Ohio, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Aug. 23, 1989, Ser. No. 397,222

Int. Cl.[5] C08F 20/00

U.S. Cl. 525—437 8 Claims

1. A method for reducing the acidity of polyesters which comprises melt reacting a carboxyl group containing polyester having an acid value ranging from 40 to 10 equivalents of CO_2H per 10^6 gm of polyester with an endcapping agent selected from the group consisting of:

(a) $R_3(R_4)N{-}C(R_1){=}CHR_2$

wherein R_1 is a C_1–C_3 alkyl radical; R_2 is H or a C_1–C_3 alkyl radical or R_1 and R_2 taken together form a cycloalkene structure having 3 to 7 carbon atoms and R_3 and R_4 are independently C_1–C_4 alkyl radicals or taken together form a hetero ring; and

b) $R_5N{=}CHR_6$

wherein R_5 and R_6 are independently aromatic, cyclohexyl or C_1–C_5 alkyl radicals;

in an amount ranging from 1 to 50 millimoles per minute for each 100 grams per minute of polyester feed at a temperature in the range of 270° to 320° C., thereby effecting endcapping of the carboxyl groups of the polyester to an acid content below 10 milliequivalents of CO_2H per 10^6 gm of polyester.

4,988,778

POLYAMINE-FUNCTIONAL SILANE RESIN

Wen-Hsuan Chang, and J. Alden Erikson, both of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 18, 1990, Ser. No. 466,892

Int. Cl.[5] C08L 63/00

U.S. Cl. 525—476 7 Claims

1. A stable polyamine-functional silane resin which is prepared by reacting:

(i) an aminoalkoxysilane and

(ii) a hydroxy- and amine-functional compound.

4,988,779

ADDITION CURED SILICONE PRESSURE SENSITIVE ADHESIVE

George F. Medford, Ballston Lake, and Donald S. Johnson, Scotia, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,041

Int. Cl.[5] C08F 283/00

U.S. Cl. 525—478 22 Claims

1. A composition suitable for use as a pressure sensitive adhesive and having, in the cured state, a tack of greater than 200 g/cm^2 and a peel adhesion strength greater than 20 ounces/inch,

(a) from 50 to 70 parts by weight of a solid, benzene soluble resin copolymer consisting essentially of

$R_3SiO_{\frac{1}{2}}$ units and $SiO_{4/2}$ units

where each R individually is a monovalent hydrocarbon radical containing no more than six carbon atoms, there being from 0.6 to 0.9 inclusive $R_3SiO_{\frac{1}{2}}$ units for every $SiO_{4/2}$ units,

at least 95 percent of all R radicals in (a) being methyl and the total number of R radicals in (a) that have olefinic unsaturation being 0–0.5 percent of all R radicals in (a),

(b) from about 30 to about 50 parts by weight of an essentially cyclic free, polydiorganosiloxane of the average formula

$R_2{}^1R^2SiO(R_2{}^1SiO)_m(R^1R^2SiO)_nSiR^2R_2{}^1$

where each R^1 individually is a radical selected from the group consisting of methyl, ethyl, propyl, and phenyl, at least 95 percent of all R^1 radicals being methyl, each R^2 individually is a vinyl radical or any R^1 as defined above with the proviso that at least 2 R^2 radicals must be vinyl and m+n has an average value such that the viscosity of the polydiorganosiloxane (b) centipoises at 25° C., the total of (a) and (b) being 100 parts by weight;

(c) an amount of an organopolysiloxane which is at least partially soluble in the mixture of (a) and (b) and having an average unit formula

$R^3{}_aH_bSiO_{(4-a-b)/2}$

where each R^3 individually is any R^1 radical as defined above, a has a value of from 1.00 to less than 2.00, b has a value of from 0.05 to 1.00, the sum of a plus b being from 1.10 to less than 3.00, there being an average of greater than two silicon bonded hydrogen atoms per molecule of (c), no silicon atom bearing more than one silicon bonded hydrogen atom and the amount of (c) present being sufficient to provide from 1.0 to 30.0 silicon bonded hydrogen atoms for every olefinically unsaturated radical in the total of (a) plus (b) and,

(d) a platinum containing catalyst in sufficient quantity to provide at least 0.1 part by weight of the combined weight of (a), (b), and (c).

4,988,780

FLAME RESISTANT ARTICLE MADE OF PHENOLIC TRIAZINE AND RELATED METHOD USING A PURE CYANATO NOVOLAC

Sajal Das, Parsippany; Dusan C. Prevorsek; Raj Sharma, both of Morristown, and Bruce DeBona, Randolph, all of N.J., assignors to Allied-Signal, Morris Township, Morris County, N.J.

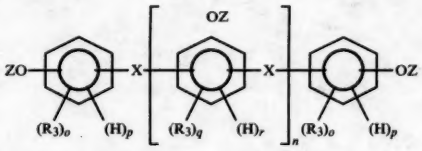
Filed Aug. 15, 1988, Ser. No. 232,407

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] C08G *8/28;* C08L *61/06*

U.S. Cl. 525—504 21 Claims

1. A method of manufacturing articles made of a composition comprising a phenolic triazine resin having a LOI equal to or greater than about 40 comprising the steps of fabricating a composition comprising a cyanato group containing phenolic resin of the formula:



into the shape of said article forming a shaped composition; and completely curing said cyanato group phenolic resin in said shaped composition to form said article; wherein:

n is a positive whole number greater or equal to 1;

q and r are the same or different at each occurrence and are whole numbers from 0 to 3, with the proviso that the sum of q and r at each occurrence is equal to 3;

Z is —CN, or hydrogen and —CN;

o and p are the same or different at each occurrence and are whole numbers from 0 to 4 with the proviso that the sum of o and p at each occurrence is equal to 4;

—X— is a divalent organic radical, and

R_3 is the same or different at each occurrence and is a substituent other than hydrogen which is unreactive under conditions necessary to completely cure the cyanato group containing phenolic resin.

4,988,781

PROCESS FOR PRODUCING HOMOGENEOUS MODIFIED COPOLYMERS OF ETHYLENE/ALPHA-OLEFIN CARBOXYLIC ACIDS OR ESTERS

Osborne K. McKinney, Lake Jackson; David A. Eversdyk, Angleton, and Michael E. Rowland, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 44,865, Apr. 30, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 316,257

Int. Cl.[5] C08F *2/38, 210/00*

U.S. Cl. 526—68 21 Claims

1. A process for producing high molecular weight, modified, homogeneous, random interpolymers having melt flow rates in the range of about 0.1 to about 300 g/10 min., as determined by ASTM D-1238 (190° C./2160 g) and reduced long chain branching, comprising about 99% to about 65% by weight of ethylene monomer and about 1% to about 35% by weight of at least one olefinically unsaturated comonomer selected from the group consisting of unsaturated carboxylic acids, alkyl acrylates and alkyl methacrylates, said process comprising interpolymerizing the monomers in a substantially constant environment, under steady state conditions, in a single-phase reaction mixture, in the presence of minor amounts of one or more telogenic modifiers, under the influence of a free-radical initiator, and in a well-stirred autoclave reactor operated in a continuous manner and at an unreacted gas recycle rate sufficient to produce said high molecular weight interpolymers as the monomers, telogenic modifier(s), and initiator are fed into the reactor and the reaction mixture is withdrawn, said process being characterized by the use of synthesis conditions of temperature and pressure which are elevated to a level above the phase boundary between two-phase and single-phase operation and further characterized by the use of either, or both of, (a) a temperature which is lower than, or (b) a pressure which is higher than that which would be required without the presence of the modifier, said process further characterized by controlling said minor amounts of said one or more telogenic modifiers and said high molecular weight of said interpolymers by controlling said telogenic modifier(s) feed rate, or unreacted gas recycle rate, or both.

4,988,782

ALKENE POLYMERIZATION PROCESS AND CATALYST COMPOSITIONS THEREFOR

Ian G. Carson, and Petrus A. Bentveisen, both of Amsterdam, Netherlands, assignors to Shell Internationale Research Maatschappij, B.V., Hague, Netherlands

Filed Oct. 25, 1989, Ser. No. 426,289

Claims priority, application United Kingdom, Oct. 26, 1988, 8825056

Int. Cl.[5] C08F *4/655*

U.S. Cl. 526—125 2 Claims

1. A process for the polymerization of alkenes comprising polymerizing said alkenes under polymerization conditions in the presence of a catalyst composition prepared by a process which comprises combining:

(a) a solid catalyst component comprising a magnesium dihalide, an electron donor and a halide of tetravalent titanium,

(b) a tri-alkylaluminium compound,

(c) an electron donor, and

(d) a di-alkylaluminum halide, characterized in that the catalyst composition is prepared by combining the components in the following order of addition: -first introducing component (c), - then adding a reaction product of components (a) and (d), and - lastly adding component (b).

4,988,783

ETHYLENE POLYMERIZATION USING SUPPORTED VANADIUM CATALYST

Debra L. Beran, Crosslanes, W. Va.; Kevin J. Cann, Belle Mead, N.J.; Robert J. Jorgensen, Dunbar, W. Va.; Frederick J. Karol, Belle Mead, N.J.; Norma J. Maraschin, Somerset, N.J., and Arthur E. Marcinkowsky, Charleston, W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 587,006, Mar. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 480,297, Mar. 29, 1983, Pat. No. 4,508,842. This application Feb. 2, 1990, Ser. No. 473,104

Int. Cl.[5] C08F *4/618, 4/611*

U.S. Cl. 526—129 16 Claims

1. A process for producing ethylene polymers which comprises polymerizing ethylene with or without at least one C_3 to C_{10} alpha-olefin monomer in the gas phase at a temperature between about 10° C. to about 115° C., by contacting the monomers with a catalyst composition comprising:

(A) a supported precursor consisting essentially of a vanadium compound and modifier impregnated on a solid, inert carrier, said carrier consisting essentially of silica or alumina and being free of preparative chemical treatment with an alkylaluminum compound prior to formation of the supported precursor, said supported precursor composition being prepared by impregnating said carrier first with the vanadium compound and subsequently with the modifier,

(1) said vanadium compound being the reaction product of:

(a) a vanadium trihalide of chlorine, bromine or iodine; and

(b) an electron donor which is a liquid, organic Lewis base in which said vanadium trihalide is soluble, said electron donor being selected from the group consisting of alkyl esters of aliphatic and a romatic carboxylic acids, aliphatic ketones, aliphatic amines, alkyl and cycloalkyl ethers, and mixtures thereof; and

(2) said modifier having the formula:

$$MX_a$$

wherein:

M is $AlR_{(3-a)}$ and wherein each R is independently alkyl, provided that the total number of aliphatic carbon atoms in any one R group may not exceed 14;

X is chlorine, bromine or iodine; and

a is 1 or 2; and said modifier being employed in an amount of from 0.2 to 2.5 moles per mole of electron donor present in said vanadium compound;

(B) a cocatalyst having the formula:

$$AlR_3$$

wherein

R is as previously defined; and

(C) a promoter having the formula:

$$R'_bCX'_{(4-b)}$$

wherein:

R' is hydrogen or unsubstituted or halosubstituted lower alkyl;

X' is halogen; and

b is 0, 1 or 2.

4,988,784

CATALYST FOR REGULATING THE MOLECULAR WEIGHT DISTRIBUTION OF ETHYLENE POLYMERS

Sun-Chueh Kao, Piscataway, and Frederick J. Karol, Belle Mead, both of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Division of Ser. No. 214,581, Jul. 1, 1988, Pat. No. 4,886,771. This application Nov. 29, 1989, Ser. No. 442,581

Int. Cl.[5] C08F *4/68*

U.S. Cl. 526—133 **6 Claims**

1. In a process for homopolymerizing ethylene, or copolymerizing ethylene with one or more alpha olefins containing from 3 to 8 carbon atoms, with a catalyst system comprising

(A) a solid catalyst precursor consisting essentially of

(1) a solid, particulate, porous, inorganic carrier, as support for

(2) the reaction product of (a) a vanadium trihalide and (b) an electron donor, and

(3) a boron halide or alkylaluminum modifier,

(B) an alkylaluminum cocatalyst, and

(C) a halohydrocarbon polymerization promoter,

the improvement which comprises treating solid catalyst precursor (A) with a phosphorus-containing molecular weight distribution regulator having the formula

$$R_3P{=}O$$

wherein:

R is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 carbon atoms, or ORl wherein R^1 is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 carbon atoms.

4,988,785

BISMALEIMIDE RESIN BASED ON INDANE BISPHENOL

Charles W. Paul, Madison; Kundan M. Patel, Landing, both of N.J., and Stephen C. Arnold, New Hope, Pa., assignors to Allied-Signal, Morris Township, Morris County, N.J.

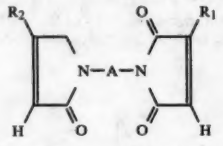
Filed Jun. 30, 1989, Ser. No. 375,178

Int. Cl.[5] C08F *26/06*

U.S. Cl. 526—259 **21 Claims**

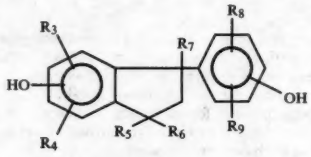
1. A precured heat curable composition comprising a mixture of

a. one or more polymaleimide compounds of the formula:



and;

b. one or more indane bisphenol compounds of the formula:



wherein:

R_1, R_2, R_4, R_5, R_6, R_7 and R_9 are the same or different at each occurrence and are hydrogen, alkyl, phenyl, cycloalkenyl, alkylphenyl, alkenyl, alkoxphenyl, phenylalkyl, alkoxy, alkoxyalkyl, nitro, halogen, cyano, cycloalkyl or hydroxy;

A is a divalent organic moiety having from 1 to about 30 carbon atoms; and

R_3 and R_8 are the same or different at each occurrence and are alkenyl;

wherein the open valencies are substituted with hydrogen.

4,988,786

HYDROPHOBIC CROSSLINKED COPOLYMER FROM ETHYLENIC ESTER OR CARBAMATE WITH POLYETHYLENIC MONOMER

Takateru Uchida, Yokohama, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Oct. 9, 1987, Ser. No. 106,356

Claims priority, application Japan, Oct. 24, 1986, 61-251793; Feb. 24, 1987, 62-39018

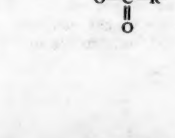
Int. Cl.[5] C08F *226/00*

U.S. Cl. 526—261 **4 Claims**

1. A hydrophobic crosslinked copolymer consisting essentially of:

(A) 100 parts by weight of monomer units consisting essentially of:

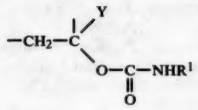
(1) 10 to 100% by weight, based on the total weight of the monomer units (A), of a monomer unit represented by the formula selected from the group consisting of:



(I)

-continued

and

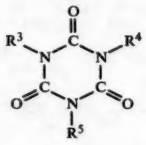


(III)

wherein R^1 represents at least one hydrophobic group having a hydrophobic fragmental constant of at least 1.5, and Y represents a hydrogen atom or a methyl group; and

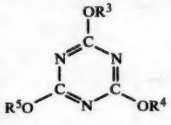
(2) 0 to 90% by weight, based on a total weight of the monomer units (A), of monomer units other than the monomer units of the formula (I) and (III); and

(B) 90 to 6000 parts by weight of crosslinking monomer units derived from a crosslinking agent represented by the formula:



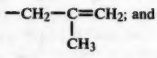
(VII)

or



(VIII)

in which R^3, R^4 and R^5 each independently represent $-CH_2-CH=CH_2$, $-CH_2-C\equiv CH$ or



wherein said copolymer has:

a specific surface area (SA) in the range satisfying the inequality;

$30 \leqq SA \leqq 1000\ m^2/g$; and

an acetonitrile regain value (AR) in the range satisfying the inequality:

$0.2 \leqq AR \leqq 3.0\ ml/g$.

4,988,787

ALTERNATING COPOLYMERS, A PROCESS FOR THEIR PREPARATION, AND A METHOD OF USE THEREOF

Werner Mormann, Kreuztal, and Kerstin Schmalz, Siegen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

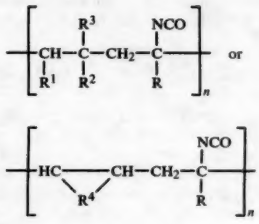
Filed Jun. 4, 1990, Ser. No. 532,426

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1989, 3918893

Int. Cl.[5] C08F *226/06, 222/04*

U.S. Cl. 526—262 **3 Claims**

1. An alternating copolymer having the formula



or

wherein

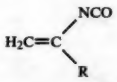
R is hydrogen, C_1–C_6 alkyl, or (C_1–C_6 alkyl) (C_1–C_6 alkane)-carboxylate;

one of R^1, R^2, and R^3 in each repeating unit is hydrogen and the others of R^1, R^2, and R^3 in each repeating unit are CN or $COOR^5$, wherein R^5 is C_1–C_8 alkyl;

R^4 is $-(O{=}C)-O-(C{=}O)-$ or $-(O{=}C)-NH-(C{=}O)-$; and n is from about 10 to about 5,000;

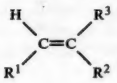
wherein said alternating copolymer is a copolymerization product of

(a) an alkenyl isocyanate of the formula



wherein R is hydrogen, C_1–C_6 alkyl, or (C_1–C_6 alkyl) (C_1–C_6 alkane)carboxylate, and

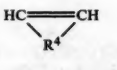
(b) an electron deficient olefin of the formula



(i)

wherein

one of R^1, R^2, and R^3 is hydrogen and the others of R^1, R^2, and R^3 are CN or $COOR^5$, wherein R^5 is C_1–C_8 alkyl; or



(ii)

wherein R^4 is $-(O{=}C)-O-(C{=}O)-$ or $-(O{=}C)-NH-(C{=}O)-$.

4,988,788

ROOM TEMPERATURE-CURABLE COATING COMPOSITION

Mitsuhiro Takarada, Annaka, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Japan

Continuation-in-part of Ser. No. 134,360, Dec. 17, 1987, abandoned. This application Jul. 8, 1988, Ser. No. 216,838

Claims priority, application Japan, Dec. 29, 1986, 61-310938

Int. Cl.[5] C08F *230/08*

U.S. Cl. 526—279 **10 Claims**

1. A room temperature-curable coating composition which comprises, as the resinous constituent, a copolymer which is a product of radical copolymerization of a ternary monomeric mixture consisting of:

(A) from 20 to 80% by weight of a first monomeric component which is an alkyl acrylate, an alkyl methacrylate or a combination thereof:

(B) from 10 to 78% by weight of a second monomeric com-

ponent which is an oligomeric organopolysiloxyalkyl acrylate or methacrylate having 2 to 6 silicon atoms and an w-(meth)acryloxy alkyl group represented by the general formula

$$CH_2{=}CR{-}CO{-}O{-}(-CH_2)_n$$

in which R is a hydrogen atom or a methyl group and the subscript n is a positive integer, bonded to the silicon atom which is a member of the polysiloxane structure; and

(C) from 2 to 30% by weight of a third monomeric component which is an organosilane compound having at least one hydrolyzable functional group and a radical-polymerizable unsaturated group.

4,988,789

PROCESS FOR PREPARING GLYCINE HYDROCHLORIDE

Jerome Linder, Westfield, N.J., assignor to Sandoz Ltd., Basel, Switzerland

Filed Jan. 5, 1990, Ser. No. 461,157
Int. Cl.[5] C07C 227/00
U.S. Cl. 562—575 22 Claims

1. A process for preparing glycine hydrochloride comprising: (1) in a first step, adding glycine to concentrated hydrochloric acid, heating the mixture, cooling the resultant solution, and filtering the resultant solid to obtain a first crop of glycine hydrochloride; and (2) in a second step, cooling the aqueous filtrate from the first step, adding a molar excess of anhydrous hydrogen chloride to the cooled filtrate, allowing the mixture to warm to room temperature, cooling the mixture, and filtering the resultant solid to obtain a second crop of glycine hydrochloride.

4,988,790

SUBSTANCES FOR THE MANUFACTURE OF PAPER

Rudolf Behn; Branislav Böhmer; Lutz Hoppe, and Klaus Szablikowski, all of Walsrode, Fed. Rep. of Germany, assignors to Wolff Walsrode AG, Walsrode, Fed. Rep. of Germany

Filed Jan. 28, 1988, Ser. No. 149,470
Claims priority, application Fed. Rep. of Germany, Feb. 11, 1987, 3704173
Int. Cl.[5] C08J 00/00
U.S. Cl. 524—514 16 Claims

1. An agent suitable for the manufacture of paper consisting essentially of an aqueous, homogeneous, storage stable solution of a cationic polyacrylamide (C) and at least one other polymer selected from the group consisting of

(A) 25 to 90% by weight, based on polymer content, of at least one polyamidamine and

(B) 25 to 90% by weight, based on polymer content, of at least one polyamine,

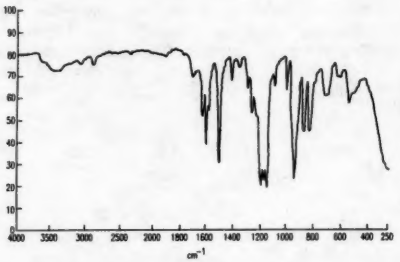
said (C) being 10 to 75% by weight, based on polymer content, of at least one cationic polyacrylamide having recurrent dimethylaminopropylacrylamide units which may be quaternized, wherein the proportion of polymers (A) to (C) is at least 1% by weight, based on the total weight of the agent.

4,988,791

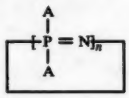
NON-LINEAR PHOSPHAZENE POLYMER HAVING SCHIFF BASE STRUCTURES, PROCESS FOR THE PREPARATION THEREOF, AND CURABLE PHOSPHAZENE COMPOSITION

Isao Maruyama, Ichihara; Hiroshi Fujiwara, Ohmiya; Yoshiharu Ito, and Hitoshi Shigematsu, both of Ichihara, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Jul. 11, 1989, Ser. No. 379,930
Claims priority, application Japan, Jul. 13, 1988, 63-174410
Int. Cl.[5] C08G 79/02
U.S. Cl. 528—168 10 Claims

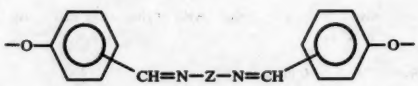


1. A non-linear phosphazene polymer which is a polymeric condensation reaction product of a cyclic phosphonitrilic compound represented by the general formula (I):



(I)

(wherein n is an integer 3 or 4, and wherein the A's in two of said n units are independently selected from a group consisting of a formylphenoxy group, a phenoxy group, an alkylphenoxy group, a halogenated phenoxy group, a N-aromatic azomethinephenoxy group, and a fluoroalkoxy group, provided more than 2 formylphenoxy groups being contained per molecule on the average) and (II) a primary diamine or primary polyamine, and in which said condensation product contains Schiff base bonds derived from formylphenoxy groups and amines and said product containing said Schiff base bonds and is represented by the formula:



(wherein Z is a residual group of said primary diamine or primary polyamine including groups that form Schiff base structures).

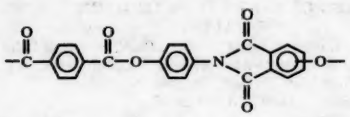
4,988,792

LIQUID CRYSTALLINE POLYESTERETHERIMIDE FROM A BISIMIDODIPHENOL

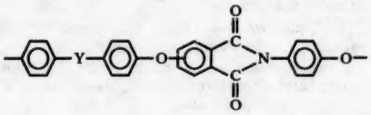
David N. Schissel, Scotia, and Deborah A. Haitko, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 19, 1990, Ser. No. 467,453
Int. Cl.[5] C08G 73/16
U.S. Cl. 528—170 3 Claims

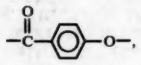
1. A liquid crystalline polyesteretherimide comprising structural units of the formulas



(I)

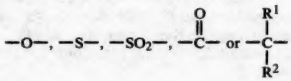


and



(II)

wherein Y is



and each of R^1 and R^2 is independently hydrogen, methyl or ethyl.

4,988,793

POWDER COATING COMPOSITIONS

Robert B. Barbee, and Brian S. Phillips, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 23, 1989, Ser. No. 355,705
Int. Cl.[5] C08G *63/20*
U.S. Cl. 528—272 **17 Claims**

1. A thermosetting coating composition in the form of a powder having an average particle size of about 10 to 300 microns comprising:

(1) a polyester having a glass transition temperature of at least 40° C., a hydroxyl number of about 20 to 200, an acid number of 0 to about 15 and an inherent viscosity of about 0.1 to 0.5 comprised of:

(a) diacid residues comprising at least 50 mole percent terephthalic acid residues; and

(b) diol residues comprising from about 20 to 100 mole percent 1,3-bis(2-hydroxyethoxy)benzene residues and from 0 to about 80 mole percent 2,2-dimethyl-1,3-propanediol residues; and

(2) a cross-linking effective amount of a blocked polyisocyanate compound.

4,988,794

POLYESTER RESIN FOR TONER AND PROCESS FOR ITS PRODUCTION

Shinji Kubo; Ryo Funato, both of Nagoya; Noriyuki Tajiri, Toyohashi; Hirokazu Ito, Toyohashi, and Hitoshi Iwasaki, Toyohashi, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan

Continuation of Ser. No. 343,499, Apr. 26, 1989, abandoned, which is a continuation of Ser. No. 190,099, May 4, 1988, abandoned. This application Feb. 26, 1990, Ser. No. 485,762
Claims priority, application Japan, May 13, 1987, 62-116414
Int. Cl.[5] C08G *63/02*
U.S. Cl. 528—272 **4 Claims**

1. A polyester resin for toner, which consists essentially of (a) from 0.5 to 50 mol %, based on the entire alcohol components, of at least one trihydric or higher polyhydric alcohol, (b) from 50 to 99.5 mol %, based on the entire alcohol components, of at least one diol and (c) at least one member selected from the group consisting of dicarboxylic acids and lower alkyl esters thereof, and which has a softening temperature of from 90° to 170° C., a glass transition temperature (T9) of from 30° to 70° C., an acid value of from 0.5 to 15 mgKOH/g and a gel content of from 1.5 to 40%.

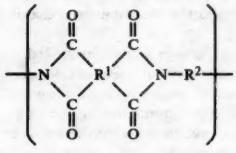
4,988,795

AMPHIPHILIC POLYIMIDE PRECURSOR AND PROCESS FOR PREPARING THE SAME FROM FATTY-SUBSTITUTED POLYAMIDE-ACIDS

Masakazu Uekita, and Hiroshi Awaji, both of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 213,202, Jun. 29, 1988, Pat. No. 4,897,461. This application Sep. 7, 1989, Ser. No. 404,020
Claims priority, application Japan, Jul. 16, 1985, 60-157354
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] C08G *73/10*
U.S. Cl. 528—353 **5 Claims**

1. A film comprising at least one monomolecular layer of a polyimide having recurring units of the formula



wherein R^1 is a tetravalent group having at least 2 carbon atoms, and R^2 is a bivalent group having at least 2 carbon atoms.

4,988,796

PROCESS FOR PREPARING POLY(ARYLENE SULFIDE SULFONE)

Michael D. Cliffton, Kingsport, Tenn., and Jon F. Geibel, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 20, 1990, Ser. No. 481,529
Int. Cl.[5] C08G *75/20*
U.S. Cl. 528—388 **13 Claims**

1. A process for the production of poly(arylene sulfide sulfone) comprising contacting:

(a) at least one dihaloaromatic sulfone,

(b) at least one organic amide,

(c) at least one sulfur-containing compound selected from the group consisting of alkali metal bisulfides, hydrogen sulfide and N-methyl-2-pyrrolidinethione,

(d) water, and

(e) at least one alkali metal carboxylate.

4,988,797

CATIONIC POLYMERIZATION OF CYCLIC ETHERS

Robert B. Wardle, and Jerald C. Hinshaw, both of Logan, Utah, assignors to Thiokol Corporation, Ogden, Utah

Filed Mar. 14, 1989, Ser. No. 323,588
Int. Cl.[5] C08G *65/10, 65/18, 65/20*
U.S. Cl. 528—408 **11 Claims**

1. A method of polymerizing a cyclic ether monomer which is capable of cationic polymerization comprising

providing a cyclic ether monomer or mixture of cyclic ether monomers capable of cationic polymerization,

providing an alcohol and an acid catalyst, the catalyst being effective to cooperate with said alcohol to initiate cationic polymerization of the cyclic ether monomer(s),

mixing said alcohol and said acid catalyst, and

bringing such mixture of said alcohol and said acid catalyst into contact with said cyclic ether monomer(s) so as to effect polymerization of said cyclic ether monomer(s),

the improvement comprising,

said acid catalyst and said alcohol being provided in an amount such that if said acid catalyst is a Lewis acid, the molar ratio of acid catalyst to hydroxyl group(s) on said alcohol is between about 0.05:1 and about 0.5:1, and if said acid catalyst is a proton acid, the molar ratio of hydrogen ions releasable from said acid to hydroxyl group(s) of said alcohol is between about 0.05:1 and about 0.5:1.

4,988,798

METHOD FOR RECOVERING RECOMBINANT PROTEINS

Galina Blum, Fairport, N.Y.; Ren-der Yang, and Eun K. Lee, both of Terre Haute, Ind., assignors to Pitman-Moore, Inc., Lake Forest, Ill.

Filed Jan. 22, 1990, Ser. No. 468,054

Int. Cl.[5] C07K *3/24, 15/06*

U.S. Cl. 530—399 **11 Claims**

1. A method for recovering recombinant somatotropin from a protein solution containing high molecular weight contaminating proteins and the recombinant somatotropin, consisting essentially of:

directly adding one or more Group IIA metal salts to the solution in amounts sufficient to selectively precipitate the high molecular weight contaminating proteins while leaving somatotropin monomers in solution;

separating the precipitate from the solution; and

recovering the recombinant protein from the solution.

4,988,799

LIGNOSULFONATE BASED PHARMACOLOGIC AGENT WITH ANTI-COAGULANT AND ANTI-THROMBOTIC ACTIVITY

Russell H. Samson, Sarasota, Fla., and John W. Hollis, Jr., Schofield, Wis., assignors to Daishowa Chemicals Inc., Rothschild, Wis.

Filed Aug. 11, 1987, Ser. No. 84,620

Int. Cl.[5] C07G *1/00;* A61K *31/70*

U.S. Cl. 530—505 **16 Claims**

1. A method of making a pharmacologic agent having anti-thrombotic activity, comprising the steps of:

liquid-liquid extracting an aqueous mixture of a substantially sulfite-free spent sulfite liquor having a pH of 2 to 6 with an amine dissolved in a water immiscible alcohol to form an amine-lignosulfonate-alcohol liquid phase and an aqueous phase, wherein the amount of amine added to the sulfite liquor is 60–70% molarly equivalent to the original spent sulfite liquor sulfonic sulfur content;

separating the amine-lignosulfonate-alcohol liquid phase from the aqueous phase;

liquid-liquid extracting the amine-lignosulfonate-alcohol liquid phase with an alkali to form a M-lignosulfonate aqueous phase having a pH of 8 to 14, where M is selected from ammonium, sodium, potassium, lithium, calcium and magnesium, and a substantially lignosulfonate-free amine-alcohol liquid phase;

separating the M-lignosulfonate aqueous phase from the amine-alcohol liquid phase;

reducing the alkaline pH of the M-lignosulfonate aqueous phase to a substantially neutral pH while simultaneously forming insoluble impurities subsequent to the separation of the M-lignosulfonate and amine-alcohol liquid phases by treating the M-lignosulfonate aqueous phase with a cation exchange resin; and

separating the insoluble impurities from the M-lignosulfonate.

4,988,800

PREPARATION OF RARE EARTH ALKOXIDES USING CATALYST

Carl C. Greco, Garnerville, and Johst H. Burk, Mohegan Lake, both of N.Y., assignors to Akzo America Inc., New York, N.Y.

Filed May 31, 1988, Ser. No. 200,484

Int. Cl.[5] C07F *5/00*

U.S. Cl. 534—15 **8 Claims**

1. A catalytic process for the manufacture of rare earth alkoxides by the reaction of a rare earth metal and an alcohol in the presence of a catalytically effective amount of an inorganic, halide-free mercury salt for the reaction.

4,988,801

WATER SOLUBLE MONOAZO DYE-STUFFS CONTAINING VINYLSULFONE AND HALOGENOTRIAZINE OR DIFLUOROMONOCHLORO PYRIMIDINE TYPE REACTIVE GROUPS

Toshio Hihara; Kanzi Shimizu, and Yukiharu Shimizu, all of Kitakyushu, Japan, assignors to Mitsubishi Kasei Corporation, Japan

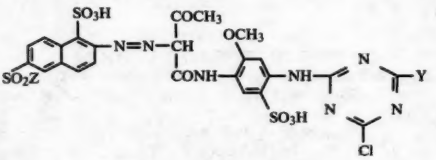
Continuation of Ser. No. 178,504, Apr. 7, 1988, abandoned. This application Dec. 20, 1989, Ser. No. 453,342

Claims priority, application Japan, Apr. 9, 1987, 62-87611

Int. Cl.[5] C09B *62/085, 62/245;* D06P *1/665, 3/66*

U.S. Cl. 534—632 **2 Claims**

1. A water-soluble monoazo colorant represented by the following formula in the form of the free acid:



(I)

wherein Y represents lower alkylamino substituted by one sulfo group or phenylamino substituted by one or two sulfo groups and Z represents—$CH=CH_2$ or—$CH_2CH_2OSO_3H$.

4,988,802

REACTIVE DYES WITH THREE REACTIVE GROUPS

Hermann Loeffler, Speyer, and Manfred Patsch, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

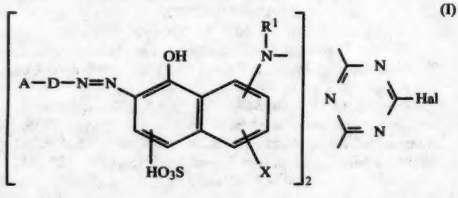
Filed Feb. 23, 1990, Ser. No. 483,647

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1989, 3908074

Int. Cl.[5] C09B *62/03, 62/09, 62/17, 62/25, 62/41*

U.S. Cl. 534—634 **3 Claims**

1. A reactive dye which possesses three reactive groups and conforms to the formula I



(I)

where

R^1 is hydrogen, methyl or ethyl,

X is hydrogen or hydroxysulfonyl,

Hal is fluorine or chlorine,

D is phenylene, carboxyl- or hydroxysulfonyl-mono-sub-

stituted or -disubstituted phenylene or hydroxy-sulfonyl-monosubstituted or -distubstituted naphthylene, and

A is a reactive group which reacts only substitutively with the hydroxyl- or nitrogen-containing groups of the substrates to be treated, or A—D together are a benzofused reactive group which reacts only substitutively with the hydroxyl- or nitrogen-containing groups of the substrates to be treated, said reactive group selected from the group consisting of 1,3,5-triazine, quinoxaline, phthalazine, pyrimidine, pyridazone and benzothiozole.

4,988,803

FIBER REACTIVE AZO DYES CONTAINING A MORPHOLINYL-, PIPERAZINYL- OR PIPERIDNYL-SUBSTITUTED FLUROTRIAZINYL RADICAL

Frank M. Stöhr, Odenthal; Hermann Henk, Cologne, and Karl-Josef Herd, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

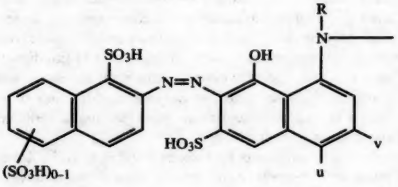
Continuation of Ser. No. 212,826, Jun. 29, 1988, abandoned. This application Jan. 5, 1990, Ser. No. 462,918

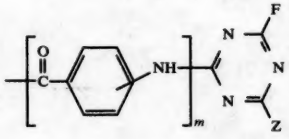
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723474; Oct. 3, 1987, 3733571

Int. Cl.[5] C09B *62/085;* **D06P** *1/382*

U.S. Cl. 534—635 **7 Claims**

1. An azo dyestuff of the formula



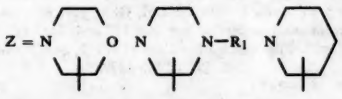


in which

u and v=H or SO_3H and u≠v,

R=H, unsubstituted C_1–C_4-alkyl or C_1–C_4-alkyl substituted by OH, halogen, SO_3H or OSO_3H,

m=0 and



in which R^1=H, unsubstituted C_1–C_6-alkyl or C_1–C_6-alkyl substituted by OH, OSO_3H, SO_3H or COOH.

4,988,804

POLYAZO DYES OBTAINED BY SUCCESSIVE COUPLING OF H-ACID AND TWO FURTHER ANILINIC DIAZO COMPONENTS ON RESORCINOL OR THE LIKE

Horst Langfeld, Grenzach-Wyhlen, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,581

Claims priority, application Switzerland, Nov. 10, 1987, 4377/87

Int. Cl.[5] C09B *33/22, 45/24;* **D06P** *1/39*

U.S. Cl. 534—684 **4 Claims**

1. A polyazo dye obtainable by

((a) diazotizing 1-amino-8-hydroxynaphthalene-3,6-disulfonic acid and coupling onto a compound of the formula

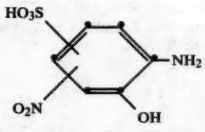
(1)

where R_1 and R_2 are each hydroxyl,

((b) coupling diazotized

o-, m-, or p-nitroaniline onto the product obtained above,

((c) coupling a diazotized compound of the formula

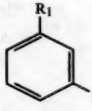


(3a)

onto the product obtained above.

4. A polyazo dye obtainable by

((a) diazotizing 1-amino-8-hydroxynaphthalene-3,6-disulfonic acid and coupling onto a compound of the formula

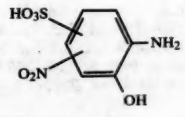


(1)

wherein R_1 and R_2 are each hydroxyl,

((b) coupling diazotized o- m-, or p-nitroaniline onto the product obtained above,

((c) coupling a diazotized compound of the formula



(3a)

onto the product obtained above and

(d) metallizing the product obtained above with an iron, cobalt, chromium, nickel or copper compound.

4,988,805

NAPHTHOLAZOPHENYLAZOAMINONAPHTHOL COMPOUNDS AND COPPER COMPLEXES THEREOF

Klaus Kunde, Neunkirchen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

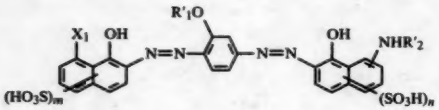
Filed Jul. 14, 1988, Ser. No. 219,108

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725082

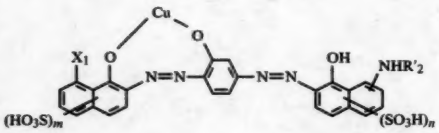
Int. Cl.[5] C09B *35/024, 35/037, 45/28;* **D06P** *3/60, 5/00;* **D21H** *21/28*

U.S. Cl. 534—717 **4 Claims**

1. A dyestuff of the formula



or



or salts thereof

wherein

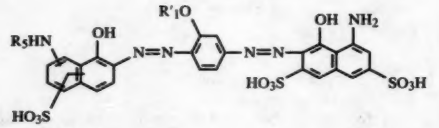
X_1 denotes hydrogen and

R'_1 denotes C_1–C_4-alkyl,

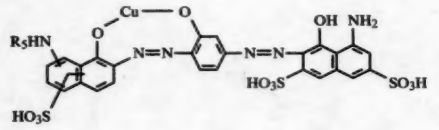
R'_2 denotes hydrogen or phenyl,

and m and n denote 1 or 2, and the sum of m and n is 3.

3. A dyestuff of the formula



or



or salts thereof, wherein

R_5 represents hydrogen or phenylcarbonyl, and

R'_1 denotes C_1–C_4-alkyl.

4,988,806

NITROGEN-CONTAINING DERIVATIVES OF CARBOXYMETHYLCELLULOSE, THEIR SYNTHESIS AND THEIR USE IN COSMETIC PREPARATIONS

Burghard Grüning; Klaus Hoffmann; Götz Koerner, and Hans-Joachim Kollmeier, all of Essen, Fed. Rep. of Germany, assignors to Th. Goldschmidt AG, Essen, Fed. Rep. of Germany

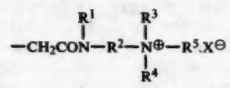
Filed Jun. 13, 1989, Ser. No. 365,612

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1988, 3820031

Int. Cl.[5] C08B *11/12, 3/00;* **A61K** *7/06, 7/09*

U.S. Cl. 536—98 **12 Claims**

1. A quaternary ammonium group containing carboxymethylcellulose derivative wherein at least a portion of the sites normally occupied by carboxymethyl groups are occupied by quaternary ammonium groups of the general formula



wherein

R^1 is hydrogen or methyl,

R^2 is a divalent aliphatic hydrocarbon group with 2 to 5 carbon atoms,

R^3, R^4 are alkyl with 1 to 4 carbon atoms,

R^5 is alkyl with 1 to 4 carbon atoms or benzyl,

X is halogen, sulfate ester group or a sulfonic acid group,

with the proviso that, on the average, at least 0.1 quaternary ammonium groups are present for each anhydroglucose unit of the polymeric molecule.

4,988,807

REMOVAL OF UNDESIRABLE MATERIAL FROM WATER-SOLUBLE POLYSACCHARIDE ETHERS

Stephen B. Christensen; Gary J. Schulz, and Susan Kling, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 300,666, Jan. 23, 1989, abandoned. This application Apr. 9, 1990, Ser. No. 506,724

Int. Cl.[5] B01D *15/04*

U.S. Cl. 536—127 **17 Claims**

1. A method of removing color bodies from a water-soluble polysaccharide ether containing such color bodies comprising:

(a) contacting an aqueous solution which comprises a water-soluble polysaccharide ether containing color bodies, with an anion exchange resin in an amount and at conditions effective to associate the color bodies with the resin; and

(b) separating the resin from the polysaccharide ether so as to result in the polysaccharide ether having a reduced concentration of color bodies;

wherein the water-soluble polysaccharide ether is in the aqueous solution in a concentration greater than about 1 weight percent.

4,988,808

PRODUCTION AND USE OF PORPHYRIN DERIVATIVES AND OF COMPOSITIONS CONTAINING SUCH DERIVATIVES

Alan R. Morgan, Swanton, and Steven H. Selman, Toledo, both of Ohio, assignors to The University of Toledo and Medical College of Ohio, Toledo, both of, Ohio, part interest to each

Continuation-in-part of Ser. No. 142,034, Jan. 11, 1988, abandoned. This application Dec. 11, 1989, Ser. No. 448,738

Int. Cl.[5] C07D *487/22*

U.S. Cl. 540—145 **2 Claims**

1. As a composition of matter, a benzochlorin having the structure of FIG. 3 or a metal complex of a benzochlorin having the structure of FIG. 1, below,

4,988,809

2-PYRIMIDINYL-1-PIPERAZINE DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND MEDICAMENTS CONTAINING THEM

Peter-Rudolf Seidel, Cologne; Harald Horstmann, Wuppertal; Jorg Traber, Lohmar; Wolfgang Dompert, Roesrath-Forsbach; Thomas Glaser, Cologne, and Teunis Schuurmann, Overath, all of Fed. Rep. of Germany, assignors to Troponwerke GmbH & Co., KG, Cologne, Fed. Rep. of Germany

Division of Ser. No. 247,813, Sep. 22, 1988, Pat. No. 4,937,343, which is a division of Ser. No. 838,238, Mar. 10, 1986, Pat. No. 4,818,756, which is a division of Ser. No. 613,858, Jun. 6, 1984, abandoned. This application Feb. 21, 1990, Ser. No. 482,580

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1983, 3321969

Int. Cl.[5] C07D *417/14*

U.S. Cl. 544—121 1 Claim

FIG. 1

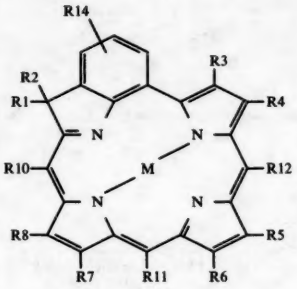
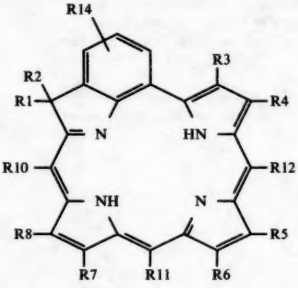


FIG. 3



wherein

M comprises a metal cation that is complexed with two of the nitrogens of the benzochlorin and is Ag, Al, Ce, Co, Cr, Cu, Dy, Er, Eu, Fe, Ga, Gd, Hf, Ho, In, La, Lu, Mn, Mo, Nd, Pb, Pd, Pr, Pt, Rh, Sb, Sc, Sm, Sn, Tb, Th, Ti, Tl, Tm, U, V, Y, Yb, Zn or Zr, and

each of **R1** through **R8** and **R10** through **R12** is H or CHO,

an alkyl group other than t-butyl having from 1 to 4 carbon atoms,

an alkylene group having from 2 to 4 carbon atoms,

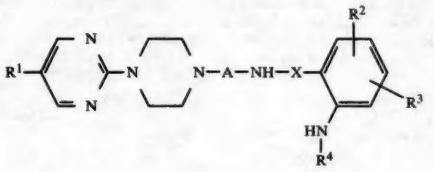
a group having the formula $R_2N(R_3)_2$ where R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon bond is either a single or a double bond, and not more than one is a double bond; R_3 is hydrogen or an alkyl radical having from 1 to 2 carbon atoms and the two R_3 groups can be the same or different,

a group having the formula $R_2N(R_4)_3$ A where R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon bond is either a single or a double bond, and not more than one is a double bond; A is a physiologically acceptable anion and R_4 is an alkyl group having from 1 to 2 carbon atoms and the three R_4 groups can be the same or different,

a group having the formula R_2OH were R_2 is a bivalent aliphatic hydrocarbon radical having from 1 to 4 carbon atoms, wherein any carbon to carbon bond is either a single or a double bond, and not more than one is a double bond, or

CO_2R', CH_2CO_2R' or $CH_2CH_2CO_2R'$ where R' is H, or an alkyl group other than t-butyl having from two to four carbon atoms, with the proviso that **R14** can be SO_3H or a salt thereof and that not more than one of **R1** through **R8**, **R10** through **R12** and **R14** is CHO, a group having the formula $R_2N(R_3)_2$, or a group having the formula $R_2N(R_4)_3A$.

1. A compound of the formula



in which

A denotes an unsubstituted alkylene group which has 1 to 6 carbon atoms in the chain or an alkylene group which has 1 to 6 atoms in the chain and is substituted by an alkyl group having 1 to 3 carbon atoms or by a hydroxyl group; and

X denotes carbonyl or sulphonyl,

R^1 represents hydrogen, unsubstituted straight-chain, branched or cyclic alkyl having 1 to 8 carbon atoms or straight-chain, branched or cyclic alkyl having 1 to 8 carbon atoms which is substituted by alkoxy or halogen; alkoxy having 1 to 4 carbon atoms; phenoxy; hydroxyl; halogen; cyano; trifluoromethyl; nitro; unsubstituted amino or amino which is substituted by 1 or 2 alkyl groups having 1 to 8 carbon atoms; alkylmercapto having 1 to 4 carbon atoms; phenylmercapto; acylamino having up to 8 carbon atoms; unsubstituted phenyl or phenyl which is substituted by halogen, nitro, amino, hydroxyl, cyano, trifluoromethyl, alkyl having 1 to 4 carbon atoms, alkoxy having up to 4 carbon atoms or acylamino having up to 8 carbon atoms; or 3-indolyl;

R^2 and R^3, which can be identical or different, represent hydrogen; unsubstituted straight-chain, branched or cyclic alkyl having 1 to 8 carbon atoms or straightchain, branched or cycloalkyl having 1 to 8 carbon atoms which is substituted for halogen; unsubstituted alkoxy having 1 to 4 carbon atoms or alkoxy having 1 to 4 carbon atoms which is substituted by halogen; unsubstituted aryl or aryl which is monosubstituted or polysubstituted by straight-chain or branched alkyl having 1 to 43 carbon atoms, alkoxy or nitro; unsubstituted carbamoyl or carbamoyl the amide group being substituted by alkyl having 1 to 10 carbon atoms or aryl; unsubstituted sulphamoyl or sulphamoyl the amide group being substituted optionally by alkyl having 1 to 10 carbon atoms or aryl; halogen; hydroxyl; nitro; cyano; alkylmercapto having 1 to 4 carbon atoms; unsubstituted amino or amino which is substituted by alkyl having 1 to 8 carbon atoms; morpholino; piperidino; piperazino; alkylsulphonamido, the alkyl radical containing 1 to 8 carbon atoms; unsubstituted arylsulphonamido or arylsulphonamido in which the phenyl radical is substituted by alkyl having 1 to 4 carbon atoms, halogen, alkoxy, alkylmercapto, hydroxyl, amino, nitro or trifluoromethyl; carboxyl; alkoxycarbonyl in which the

alkoxy group contains a straight-chain, branched or cyclic alkyl having 1 to 10 carbon atoms; alkoxycarbonylamino in which the alkoxy group contains a straight-chain, branched or cyclic alkyl having 1 to 10 carbon atoms; aryloxycarbonylamino; or acylamino having 1 to 10 carbon atoms;

R^4 representing hydrogen, unsubstituted lower alkyl having up to 4 carbon atoms or phenyl or alkyl having up to 4 carbon atoms and phenyl which are substituted by halogen, trifluoromethyl, nitro, alkyl or alkoxy, each having 1 to 4 carbon atoms;

and an NO_2 group can also stand in place of the NHR_4 group.

4,988,810

HYDROQUINOLINES USEFUL AS INTERMEDIATES

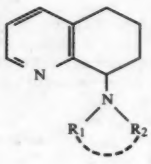
Francois Clemence; Michel Fortin; Odile Le Martret, all of Paris, and Francoise Delevallee, Fontenay Sous Bois, all of France, assignors to Roussel Uclaf, Paris, France

Division of Ser. No. 217,834, Jul. 11, 1988, which is a division of Ser. No. 2,778, Jan. 13, 1987, Pat. No. 4,816,465. This application Aug. 4, 1989, Ser. No. 389,805

Int. Cl.[5] C07D *413/00, 401/00, 215/00, 215/18*

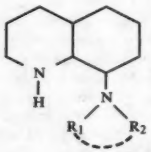
U.S. Cl. 544—128 **1 Claim**

1. A compound selected from the group consisting of compounds of formulae



II

and



III

wherein R_1 and R_2 in formula III are individually selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms or taken together with the nitrogen atom to which they are connected form a 5 to 6-member heterocycle selected from the group consisting of pyrrolidinyl, piperazinyl, piperidyl and morpholinyl optionally substituted with alkyl and alkoxy of 1 to 5 carbon atoms with the proviso that R_1 and R_2 are not both hydrogen and R_1 and R_2 in formula II form a heterocycle selected from the group consisting of pyrrolidinyl piperazinyl, piperidyl and morpholinyl optionally substituted with alkyl and alkoxy of 1 to 5 carbon atoms.

4,988,811

5-(1,2,4)-TRIAZOLYL-S-TRIAZINES

Luigi Valbusa; Enzo Coraluppi; Andrea Quaglia, and Mario Tavella, all of Savona, Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

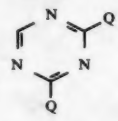
Division of Ser. No. 755,292, Jul. 15, 1985, Pat. No. 4,636,457. This application Oct. 10, 1986, Ser. No. 918,516

Claims priority, application Italy, Jul. 20, 1984, 21991 A/84

Int. Cl.[5] C07D *403/12, 403/14*

U.S. Cl. 544—207 **9 Claims**

4. A compound having the formula



wherein

Q represents $—NR_1R_2$, and

R_1 and R_2 independently represent hydrogen or a 5-(1,2,4)-triazolyl group, at least one of R_1 and R_2 being different from hydrogen.

4,988,812

AQUEOUS PROCESS FOR THE PREPARATION OF 5-METHYL-N-(ARYL)-1,2,4-TRIAZOLO(1,5-A)PYRIMIDINE-2-SULFONAMIDES

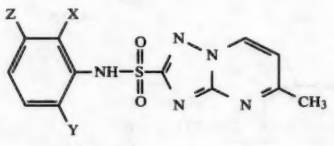
Kay K. Kim; Richard C. Krauss, all of Midland, Mich., and Jon A. Orvik, assignors to Dow Elanco, Indianapolis, Ind.

Filed Nov. 6, 1989, Ser. No. 432,241

Int. Cl.[5] C07D *487/04*

U.S. Cl. 544—263 **9 Claims**

1. A process for preparing 5-methyl-N-(aryl)-1,2,4-triazolo (1,5-a)pyrimidine-2-sulfonamides of the formula



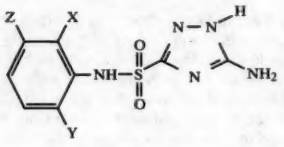
wherein

X represents F, Cl, Br or C_1–C_4 alkyl,

Y represents F, Cl, Br or NO_2, and

Z represents H, C_1–C_4 alkyl or C_1–C_4 alkoxy,

consisting essentially of contacting an N-(3-(((aryl)amino)-sulfonyl)-1H-1,2,4-triazol-5-yl)amine amine of the formula



wherein

X, Y and Z are as previously defined, with 4-methoxy-3-butene-2-one or 4,4-dimethoxybutan-2-one in the presence of an aqueous solution of base while controlling the pH of the mixture between about 8.5 and about 10.5.

4,988,813

PROCESS FOR THE PREPARATION OF FUSED PYRIDINE COMPOUNDS

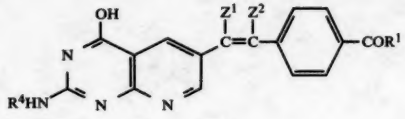
Edward C. Taylor, Princeton, and George S. K. Wong, Fort Lee, both of N.J., assignors to The Trustees of Princeton University, Princeton, N.J.

Division of Ser. No. 922,511, Oct. 20, 1986, Pat. No. 4,818,819. This application Aug. 8, 1988, Ser. No. 229,694

Int. Cl.[5] C07D *471/04*

U.S. Cl. 544—279 **19 Claims**

1. In the process of preparing a compound of the formula:



wherein

R^1 is —NHCH(COOR$_2$)CH$_2$CH$_2$COOR^2 or OR^2;

R^2 is hydrogen or a carboxylic acid protecting group;

R^4 is hydrogen or an amino protecting group;

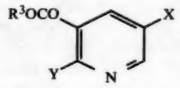
Z^1 when taken independently of Z^2 is hydrogen; and

Z^2 when taken independently of Z^1 is hydrogen, methyl or ethyl; or

Z^1 and Z^2 when taken together are a carbon-carbon bond;

the step of allowing an unsaturated compound to react with a haloaromatic compound in the presence of a palladium catalyst, said unsaturated compound and said haloaromatic compound being selected such that said haloaromatic compound is

(i) a pyridine of the formula:



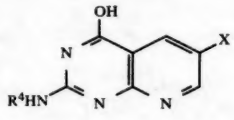
wherein

Y is amino or a nucleofuge;

X is bromo or iodo; and

R^3 is alkyl of 1 to 4 carbon atoms; or

(ii) a fused pyridine of the formula:

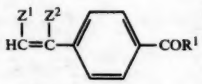


wherein

R^4 is as defined above;

X is bromo or iodo; and

said unsaturated compound is of the formula:



wherein

Z^1, Z^2, R^1, and R^2 are as defined above.

4,988,814

TERTIARY ALKYL FUNCTIONALIZED PIPERAZINE DERIVATIVES

Magid A. Abou-Gharbia, Glen Mills; John P. Yardley, Gulph Mills, both of Pa., and Ian A. Cliffe, Slough, United Kingdom, assignors to American Home Products Corp., New York, N.Y. and John Wyeth & Bro., Maidenhead, England

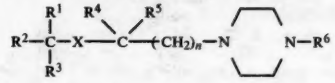
Filed Oct. 27, 1989, Ser. No. 428,148

Claims priority, application United Kingdom, Apr. 22, 1989, 8909209

Int. Cl.[5] **C07D** *403/04, 401/04*

U.S. Cl. 544—295 **37 Claims**

1. A compound of the formula:



in which

R^1 is alkyl of 1 to 6 carbon atoms;

R^2 and R^3 are alkyl of 1 to 6 carbon atoms or taken together they are polymethylene of 2 to 12 carbon atoms or taken together with the carbon atom to which they are attached, R^2 and R^3 complete a 5-norbornen-2-yl moiety;

X is —CO$_2$—, —OCO—, —OCO$_2$—, —N(R^7)CO—, —NHNHCO—, —ON(R^7)CO—, —CON(R^7)—, —N(R^7)CO$_2$—, —OCON(R^7)— or —N(R^7)CON(R^8)—; wherein R^7 and R^8 are, independently, hydrogen, alkyl of 1 to 6 carbon atoms, phenyl, benzyl, substituted phenyl or substituted benzyl in which the substituents are halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, cyano, nitro or perhalomethyl;

R^4 is hydrogen or alkyl of 1 to 6 carbon atoms;

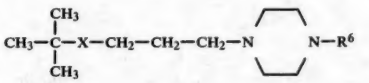
R^5 is hydrogen, alkyl of 1 to 8 carbon atoms, hydroxyalkyl of 1 to 3 carbon atoms, phenyl, benzyl, substituted phenyl or substituted benzyl in which the substituents are hydroxy, halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, trifluoromethyl, nitro, cyano, carbalkoxy of 2 to 7 carbon atoms, carboxamide, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino of 2 to 12 carbon atoms;

R^6 is phenyl, benzyl, 2-, 3-, or 4-pyridinyl, 2-pyrimidinyl or 2-pyrazinyl; any of which may be substituted by one or more hydroxy, halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, trifluoromethyl, nitro, cyano, carbalkoxy of 2 to 7 carbon atoms, carboxamido, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino of 2 to 12 carbon atoms;

and

n is one of the integers 0, 1, 2, 3, 4 or 5; or a pharmaceutically acceptable salt thereof, with the proviso that when X is —CON(R^7)— and R^7 is alkyl, R^6 is other than 2-pyrimidinyl and when X is —CO$_2$— and R^1, R^2 and R^3 are methyl and n is 1, R^6 is other than 3,5-di(trifluoromethyl)phenyl.

6. A compound of the formula:

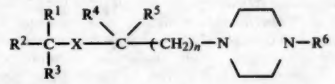


in which

X is —CO$_2$— or —NHCO$_2$—;

R^6 is 2-, 3- or 4-pyridinyl, 2-pyrimidinyl or 2-pyrazinyl, or a pharmaceutically acceptable salt thereof.

7. A compound of the formula:



in which

R^1 is alkyl of 1 to 6 carbon atoms;

R^2 and R^3, taken together, are polymethylene of 2 to 12 carbon atoms or taken together with the carbon atom to which they are attached, R^2 and R^3 complete a 5-norbornen-2-yl moiety;

X is —CO$_2$—, —OCO—, —OCO$_2$—, —N(R^7)CO—, —NHNHCO—, —ON(R^7)CO—, —CON(R^7)—, —N(R^7)CO$_2$—, —OCON(R^7)— or —N(R^7)CON(R^8)—, wherein R^7 and R^8 are, independently, hydrogen, alkyl of 1 to 6 carbon atoms, phenyl, benzyl, substituted phenyl or

substituted benzyl in which the substituents are halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, cyano, nitro or perhalomethyl;

R^4 is hydrogen or alkyl of 1 to 6 carbon atoms;

R^5 is hydrogen, alkyl of 1 to 8 carbon atoms, hydroxyalkyl of 1 to 3 carbon atoms, phenyl, benzyl, substituted phenyl or substituted benzyl in which the substituents are hydroxy, halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, trifluoromethyl, nitro, cyano, carbalkoxy of 2 to 7 carbon atoms, carboxamido, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino of 2 to 12 carbon atoms;

R^6 is phenyl, benzyl, 2-, 3-, or 4-pyridinyl, 2-pyrimidinyl or 2-pyrazinyl; any of which may be substituted by one or more hydroxy, halo, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, trifluoromethyl, nitro, cyano, carbalkoxy of 2 to 7 carbon atoms, carboxamido, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino of 2 to 12 carbon atoms;

and

n is one of the integers 0, 1, 2, 3, 4 or 5; or a pharmaceutically acceptable salt thereof, with the proviso that when X is $—CON(R^7)—$ and R^7 is alkyl, R^6 is other than 2-pyrimidinyl.

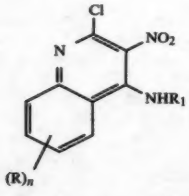
4,988,815

3-AMINO OR 3-NITRO QUINOLINE COMPOUNDS WHICH ARE INTERMEDIATES IN PREPARING 1H-IMIDAZO[4,5-C]QUINOLINES

Jean-Denis André , Pithiviers, and Daniel Lagain, Dadonville, both of France, assignors to Riker Laboratories, Inc., St. Paul, Minn.

Filed Oct. 26, 1989, Ser. No. 426,677
Int. Cl.[5] C07D *215/38*
U.S. Cl. 546—159 **6 Claims**

1. A compound of the formula



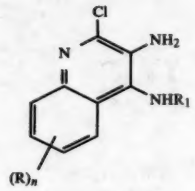
wherein

R_1 is selected from the group consisting of: straight chain or branched chain alkyl of one to about 10 carbon atoms; straight chain or branched chain alkenyl of 3 to about 10 carbon atoms wherein the olefinic unsaturation is at least one carbon atom removed from the 1-nitrogen; substituted straight chain or branched chain alkenyl of 3 to about 10 carbon atoms wherein the olefinic unsaturation is at least one carbon atom removed from the 1-nitrogen, and wherein the substituent is selected from the group consisting of lower alkyl, cycloalkyl of 3 to about 6 carbon atoms, and cycloalkyl of 3 to about 6 carbon atoms substituted by lower alkyl; substituted straight chain or branched chain alkyl of one to about 10 carbon atoms, wherein the substituent is selected from the group consisting of lower alkyl, cycloalkyl of 3 to about 6 carbon atoms, and cycloalkyl of 3 to about 6 carbon atoms substituted by lower alkyl; hydroxyalkyl of one to about 6 carbon atoms; and dihydroxyalkyl of one to about 6 carbon atoms;

each R is independently selected from the group consisting of lower alkoxy, halogen, and lower alkyl,

n is an integer from zero to 2, with the proviso that if n is 2, then said R groups together contain no more than 6 carbon atoms.

4. A compound of the formula



wherein

R_1 is selected from the group consisting of: straight chain or branched chain alkyl of one to about 10 carbon atoms; straight chain or branched chain alkenyl of 3 to about 10 carbon atoms wherein the olefinic unsaturation is at least one carbon atom removed from the 1-nitrogen; substituted straight chain or branched chain alkenyl of 3 to about 10 carbon atoms wherein the olefinic unsaturation is at least one carbon atom removed from the 1-nitrogen, and wherein the substituent is selected from the group consisting of lower alkyl, cycloalkyl of 3 to about 6 carbon atoms, and cycloalkyl of 3 to about 6 carbon atoms substituted by lower alkyl; substituted straight chain or branched chain alkyl of one to about 10 carbon atoms, wherein the substituent is selected from the group consisting of lower alkyl, cycloalkyl of 3 to about 6 carbon atoms, and cycloalkyl of 3 to about 6 carbon atoms substituted by lower alkyl; hydroxyalkyl of one to about 6 carbon atoms; or dihydroxyalkyl of one to about 6 carbon atoms;

each R is independently selected from the group consisting of lower alkoxy, halogen, and lower alkyl,

n is an integer from zero to 2, with the proviso that if n is 2, then said R groups together contain no more than 6 carbon atoms.

4,988,816

NOVEL 3-ACETOXYMETHYL-7-(IMINOACETAMIDO)-CEPHALOSPORANIC ACID DERIVATIVES

René Heymes, Romainbille, and André Lutz, Strasbourg, both of France, assignors to Roussel Uclaf, Paris, France

Continuation of Ser. No. 181,658, Apr. 14, 1988, abandoned, which is a division of Ser. No. 449,680, Dec. 14, 1982, Pat. No. 4,843,164, which is a division of Ser. No. 257,984, Apr. 27, 1981, Pat. No. 4,376,203, which is a continuation of Ser. No. 71,295, Aug. 30, 1979, abandoned, which is a division of Ser. No. 917,985, Jun. 22, 1978, Pat. No. 4,283,396, which is a division of Ser. No. 817,114, Jul. 19, 1977, Pat. No. 4,152,432, which is a continuation-in-part of Ser. No. 761,270, Jan. 21, 1977, abandoned. This application May 31, 1989, Ser. No. 359,870
Claims priority, application France, Mar. 11, 1976, 76 01834; Jun. 11, 1976, 76 07307; Jun. 23, 1976, 76 25051; Aug. 18, 1976, 76 1774
Int. Cl.[5] C07D *277/56*
U.S. Cl. 548—194 **1 Claim**

1. The syn isomer of ethyl 2-(2-amino-4-thiazolyl)-2-hydroxyimino-acetate substantially free of the anti isomer.

4,988,817

PROCESS FOR PREPARATION OF QUATERNARY AMMONIUM AND PHOSPHONIUM SUBSTITUTED CARBONIC ACID ESTERS

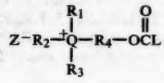
Stephen A. Madison, Valley Cottage, N.Y.; Jeffrey Bonn, Emerson, and Eddie N. Gutierrez, Palisades Park, both of N.J., assignors to Lever Brothers Company, Division of Conopco, Inc., New York, N.Y.

Filed Nov. 16, 1988, Ser. No. 272,197

Int. Cl.[5] C07D *211/42, 211/46;* **C07C** *143/26*

U.S. Cl. 546—222 **19 Claims**

1. A process for preparation of quaternary ammonium and phosphonium substituted carbonic acid esters of the formula:



(I)

wherein:

R_1, R_2 and R_3 are each a radical selected from the group consisting of alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, alkaryl, aryl, phenyl, hydroxyalkyl, polyoxyalkylene, and R_4OCOL;

or two or more of R_1, R_2, and R_3 together form an alkyl substituted or unsubstituted nitrogen-containing heterocyclic ring system;

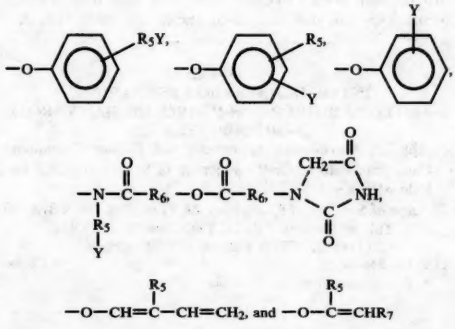
or at least one of R_1, R_2, and R_3 is attached to R_4 to form an alkyl substituted or unsubstituted nitrogen-containing heterocyclic ring system;

R_4 is selected from a bridging group consisting of alkylene, cycloalkylene, alkylenephenylene, phenylene, arylene, and polyalkoxylene; and wherein the bridging group can be unsubstituted or substituted with C_1–C_{20} atoms selected from alkyl, alkenyl, benzyl, phenyl and aryl radicals;

Z^- is a monovalent or multivalent anion leading to charge neutrality when combined with Q^+ in the appropriate ratio and wherein Z^- is sufficiently oxidatively stable not to interfere significantly with bleaching by a peroxy carbonic acid;

Q is nitrogen or phosphorous; and

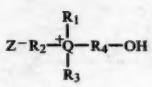
L is selected from the group consisting of:



wherein R_5 and R_6 are a C_1–C_{12} alkyl group, R_7 is H or R_5, and Y is H or a water solubilizing unit selected from the group consisting of $-SO^-{}_3M^+$, $O-COO^-M^+$, $-SO^-{}_2M^+$, $-N^+(R_8)_2X^-$, NO_2, OH, and $O\leftarrow N(R_8)_2$ and mixtures thereof; M^+ is a cation which provides solubility to the ester, and X^- is an anion which provides solubility to the ester;

comprising the steps of:

(i) reacting a hydroxyl compound of the formula:



(II)

with phosgene in an aprotic organic solvent to obtain in solution a hydrogen chloride complex of a chloroformate of the formula:

(ii) admixing said solution of the hydrogen chloride complex of the chloroformate with a salt of a material having structure L≠H, maintaining the pH no lower than 6 during said admixing until all reactants have been combined to form ester I, and thereupon lowering pH to less than 5.5 thereby stabilizing said ester in solution.

4,988,818

SYNERGISTIC TRIAZOLE COMPOUNDS

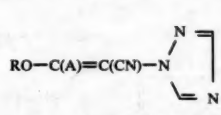
Manfred Lauer, Ludwigshafen; Matthias Zipplies, Hirschberg; Hubert Sauter, Mannheim, all of Fed. Rep. of Germany; Barbara A. Moore, Pittsboro, N.C.; Dale R. Carlson, Hillsborough, N.C.; Paul S. Zorner, Durham, N.C.; Karl-Otto Westphalen, Speyer, and Bruno Wuerzer, Otterstadt, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 6, 1989, Ser. No. 418,225

Int. Cl.[5] C07D *249/08*

U.S. Cl. 548—267.4 **2 Claims**

1. A triazole compound of the formula I



I

where A is C_7–C_{20}-alkyl, phenyl, naphthyl or pyridyl, or one of these aromatic radicals carrying from one to five halogen atoms, a phenyl or phenoxy radical or one to three hydroxy, nitro, amino, C_1–C_4-alkyl, C_1–C_4-haloalkyl, C_1–C_4-alkoxy, C_1–C_4-haloalkoxy, C_1–C_4-alkylthio or C_1–C_4-haloalkylthio radicals or is phenyl carrying a mixture of halogen and C_1–C_4-alkyl;

R is hydrogen; C_1–C_6-alkyl, C_3–C_6-alkenyl or C_3–C_6-alkynyl, or one of these groups carrying from one to five halogen atoms, or a C_1–C_4-alkoxy, C_1–C_4-haloalkoxy, C_1–C_4-alkylthio, C_1–C_4-haloalkylthio or phenyl radical; or is a radical COR^x or a radical SO_2R^x, where R^x is hydrogen, C_1–C_8-alkyl which may carry from one to three halogen atoms, or phenyl which may carry from one to five halogen atoms or from one to three C_1–C_4-alkyl, C_1–C_4-haloalkyl, C_1–C_4-alkoxy, C_1–C_4-haloalkoxy, C_1–C_4-alkylthio or C_1–C_4-haloalkylthio radicals, and environmentally compatible salts thereof.

4,988,819

FUNGICIDAL AND PLANT GROWTH-REGULATING AZOLYLMETHYL-CYCLOPROPYL DERIVATIVES

Klaus Stroech, Solingen; Wilhelm Brandes, Leichlingen, and Stefan Dutzmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

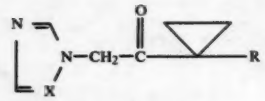
Division of Ser. No. 206,403, Jun. 14, 1988, Pat. No. 4,913,727. This application Feb. 12, 1990, Ser. No. 479,144

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720755; Apr. 19, 1988, 3812967

Int. Cl.[5] C07D *249/08*

U.S. Cl. 548—267.8 **1 Claim**

1. An azolylmethyl ketone of the formula



in which
R represents chlorine and
X represents nitrogen.

4,988,820

CYCLOALKANO(1,2-B) INDOLE-SULPONAMIDES

Horst Böshagen, Haan; Ulrich Rosentreter, Wuppertal; Folker Lieb, Leverkusen; Hermann Oediger, Cologne; Friedel Seuter; Elisabeth Perzborn, both of Wuppertal, and Volker-Bernd Fiedler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

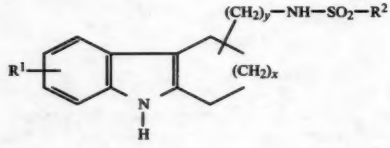
Division of Ser. No. 442,043, Nov. 28, 1989, Pat. No. 4,965,258, which is a division of Ser. No. 308,152, Feb. 8, 1989, Pat. No. 4,904,797, which is a division of Ser. No. 212,840, Jun. 29, 1988, Pat. No. 4,827,032, which is a continuation of Ser. No. 13,302, Feb. 10, 1987, abandoned. This application Jul. 20, 1990, Ser. No. 556,592

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1986, 36055622; Sep. 19, 1986, 36318248

Int. Cl.[5] C07D *209/86, 209/88, 209/94*

U.S. Cl. 548—439 **3 Claims**

1. A (benzenesulphonamidoalkyl)cycloalkyl[1,2-b]indole of the formula



in which
R^1 represents hydrogen, halogen, trifluoromethyl, carboxyl or alkoxycarbonyl; or represents a group of the formula $—S(O)_mR^3$,
in which
R^3 denotes alkyl or aryl, and
m denotes one of the numbers 0, 1 or 2; or represents a group of the formula

in which
R^4 and R^5 each independently represent hydrogen, alkyl, aryl, aralkyl or acetyl; or represents a group of the formula $—OR^6$,
in which
R^6 denotes hydrogen, alkyl, aryl, aralkyl, alkyl-SO_2—, aryl-SO_2—, aralkyl-SO_2— or trifluoromethyl; or represents alkyl, alkenyl or cycloalkyl, each of which is optionally substituted by carboxyl, alkoxycarbonyl, halogen, hydroxyl, alkoxy, alkylthio or cyano,
R^2 represents aryl which is optionally substituted up to 5 times by halogen, cyano, trifluoromethyl, trifluoromethoxy, trifluoromethylthio, alkyl, carboxyalkyl, alkoxycarbonylalkyl, alkoxy, arylthio, hydroxyl, carboxyl, alkoxycarbonyl, phenyl, phenoxy, benzyloxy, benzylthio or by a group of the formula

in which
R^4 and R^5 have the abovementioned meaning,
x represents the number 1, 2 or 3, and
y represents the number 0 or 1.

4,988,821

LIQUID CRYSTALLINE POLYESTERETHERIMIDES AND INTERMEDIATES THEREFOR

Deborah A. Haitko, Schenectady, and David N. Schissel, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

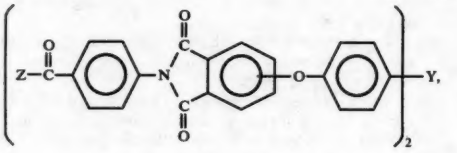
Filed Aug. 23, 1989, Ser. No. 397,208

Int. Cl.[5] C07D *403/10*

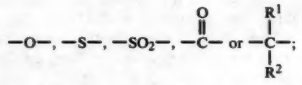
U.S. Cl. 548—461 **3 Claims**

1. A bisimidodicarboxylic acid or functional derivative thereof having the formula

(II)



wherein Y is



Z is OH, OR^3, OM or NR^3R^4; M is one equivalent of a metal or ammonium cation; each of R^1 and R^2 is independently hydrogen, methyl or ethyl; and each of R^3 and R^4 is independently a C_{1-8} alkyl or C_{6-10} aromatic hydrocarbon radical.

4,988,822

INTERMEDIATES FOR PREPARING 5-AROYL-1,2-DIHYDRO-3H-PYRROLO(1,2-A)PYRROLE-1,1-DICARBOXYLATES

Joseph M. Muchowski, Sunnyvale, and Robert Greenhouse, Cupertino, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

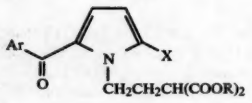
Division of Ser. No. 868,835, May 29, 1986, Pat. No. 4,873,340. This application Jul. 27, 1989, Ser. No. 386,832

Int. Cl.[5] C07D *495/04, 277/58, 403/06*

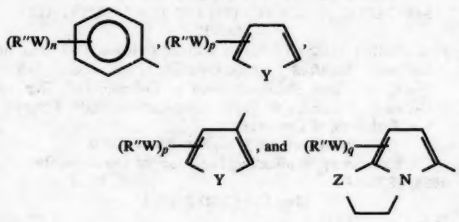
U.S. Cl. 548—539 **3 Claims**

1. A compound of the formula

(V)



in which
R is lower alkyl;
X is bromo or chloro; and
Ar is selected from the group consisting of



in which

R″ is H, lower alkyl, lower alkenyl, or lower alkynyl, optionally substituted by halogen;

W is a covalent bond, —O—, —S—, —S(O)—, —S(O)$_2$—, —NR—, —CHR—, —NO_2, fluoro, chloro, or bromo; except that if W is —NO_2, fluoro, chloro, or bromo, then R″ is absent;

Y is —O—, —S—, or —NR—;

Z is —O—, —S—, —S(O)—, —S(O)$_2$—, —NR″—, or —CHR″—;

n is 0 to 5;

p is 0 to 3; and

q is 0 to 2.

4,988,823

OPTICALLY ACTIVE OXIRANES

Johannes Kaulen, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

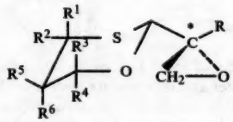
Filed Jun. 27, 1989, Ser. No. 372,062

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 3823174

Int. Cl.^{5} C07D *327/06, 411/04, 497/04*

U.S. Cl. 549—14 **4 Claims**

1. An optically active oxirane of the formula



(I)

in which

R represents a straight-chain or branched alkyl having 1 to 6 carbon atoms, which is unsubstituted or substituted by at least one of halogen, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms, the CHO group or a derivative thereof, phenoxy and phenyl, represents cycloalkyl having 3 to 8 carbon atoms, which is unsubstituted or substituted by at least one of alkyl having 1 to 4 carbon atoms, alkoxy 1 to 4 carbon atoms and halogen or represents phenyl, which is unsubstituted or substituted by at least one of alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms and halogen,

R^1, R^2, R^3, R^4, R^5 and R^6 represent hydrogen or alkyl having 1 to 4 carbon atoms, at least one of these radicals representing alkyl having 1 to 4 carbon atoms, or

R^4 and R^5 together may represent alkanediyl having 3 to 6 carbon atoms, which is unsubstituted or mono-substituted to trisubstituted by identical or different alkyl substituents having 1 to 4 carbon atoms, or

R^4 and R^5 together with the adjacent carbon atoms may represent a fused bicyclic hydrocarbon having 7 or 8 carbon atoms which is unsubstituted or monosubstituted to trisubstituted by identical or different alkyl substituents having 1 to 4 carbon atoms.

4,988,824

PROCESS FOR THE PREPARATION OF 23-(C1-C6 ALKYLOXIME)-LL-F28249 COMPOUNDS

Donald R. Maulding, 57 Katydid Dr., Somerville, N.J., and Anil Kumar, 36-C Needham Way, Princeton, N.J.

Filed Sep. 11, 1989, Ser. No. 405,793

Int. Cl.^{5} C07D *313/06*

U.S. Cl. 549—264 **20 Claims**

1. A process for the preparation of a 23-(C_1–C_6alkyloxime)-LL-F28249 compound which comprises protecting the 5-hydroxy group of a LL-F28249 compound with p-nitrobenzoyl chloride to yield a 5-O(p-nitrobenzoyl)-LL-F28249 compound; oxidizing said compound to yield a 5-O(p-nitrobenzoyl)-23-oxo-LL-F28249 derivative in a crystalline state; reacting said derivative with a C_1–C_6alkoxylamine or salt thereof to yield a 23-(C_1–C_6alkyloxime)-5-O(p-nitrobenzoyl)-LL-F28249 intermediate; and deprotecting said intermediate in the presence of base to yield the product 23-(C_1–C_6alkyloxime)-LL-F28249 compound.

4,988,825

OXIDATION OF ALDEHYDES AND KETONES USING ALKALI METAL PERBORATES

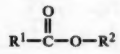
John L. Bove, Ridgewood, N.J., assignor to Cooper Union Research Foundation, Inc., New York, N.Y.

Filed Sep. 23, 1986, Ser. No. 910,615

Int. Cl.^{5} C07D *313/18, 313/04*

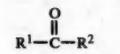
U.S. Cl. 549—272 **13 Claims**

1. A method of preparing acids and esters of the formula (I)



(I)

which comprises oxidizing a compound of formula II



(II)

with an alkali metal perborate in the presence of an acid, wherein R^1 is alkyl or aryl, R^2 is hydrogen, alkyl or aryl, or R^1 and R^2 are both hydrogen, or R^1 and R^2 together represent alkylene, provided that R^1 and R^2 may not both be methyl,

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4,988,826

PROCESS FOR INTERMEDIATES FOR INSECTICIDAL COMPOUNDS

Robin A. E. Carr, Little Sandhurst, Nr Camberley, and Lyn Powell, Macclesfield, both of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

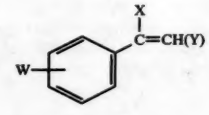
Division of Ser. No. 147,868, Jan. 25, 1988, Pat. No. 4,891,450. This application Sep. 25, 1989, Ser. No. 411,746

Claims priority, application United Kingdom, Feb. 6, 1987, 8702717

Int. Cl.^{5} C07D *317/44*

U.S. Cl. 549—445 **3 Claims**

1. A compound of the formula:



wherein W represents a bidentate group linking adjacent carbon atoms selected from alkylene of up to four carbon atoms and alkylenedioxy of up to four carbon atoms, X represents a fluoroalkyl group of up to two carbon atoms, and Y is selected from chlorine, bromine and alkoxy.

4,988,827

ETHER ISONITRILES AND RADIOLABELED COMPLEXES THEREOF

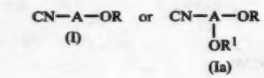
Paul L. Bergstein, Norwood, Mass., and Vinayakam Subramanyam, Wilmington, Del., assignors to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 925,091, Nov. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 812,470, Dec. 23, 1985, abandoned. This application Jun. 1, 1987, Ser. No. 56,003

Int. Cl.[5] C07D *317/00*; C07C *265/00*

U.S. Cl. 549—451 26 Claims

1. A compound which is an ethersubstituted isonitrile of the formula:



(I) (Ia)

wherein

A is a straight or branched chain alkylene group, and

R and R^1 each independently is a straight or branched chain alkyl group or taken together are a straight or branched chain alkylene group,

provided that

(1) the total number of carbon atoms in A plus R in formula (I) is 4 to 6, provided further that when the total number of carbon atoms is 6, then the carbon atom alpha to the isonitrile group is a quaternary carbon, and still further provided that A is not $(CH_2)_3$, and

(2) the total number of carbon atoms in A plus R plus R^1 in formula (Ia) is 4 to 9.

4,988,828

PHENOXYPROPYL DERIVATIVES

Noriaki Kashiwaba, Kawasaki; Hajime Matsumoto, Hino; Akihiko Hosoda, Shiki, and Yasuo Sekine, Yokohama, all of Japan, assignors to Fujirebio Kabushiki Kaisha, Tokyo, Japan

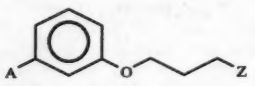
Filed Nov. 23, 1988, Ser. No. 275,375

Claims priority, application Japan, Nov. 27, 1987, 62-297328; Nov. 27, 1987, 62-297329; Dec. 25, 1987, 62-326769; Dec. 25, 1987, 62-326770

Int. Cl.[5] C07D *307/46*, *309/12*

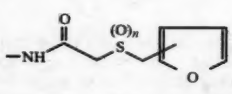
U.S. Cl. 549—496 6 Claims

1. A phenoxypropyl derivative represented by the following formula



(I)

wherein A represents a hydroxymethyl group, a protected hydroxymethyl group, or a halomethyl group, and Z represents a group of the formula



in which n is 0, 1 or 2.

4,988,829

PROCESS FOR THE PREPARATION OF 2-(4-CHLOROPHENYLETHYL)-2-TERT.-BUTYL-OXIRANE

Paul Fiedler; Martin Littmann, both of Cologne, Fed. Rep. of Germany; Manfred Lenthe, Overland Park, Kans.; Achim Noak, and Gerd Siekmann, both of Cologne, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

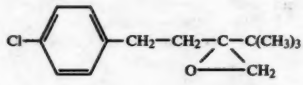
Filed Jun. 30, 1989, Ser. No. 373,770

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1988, 3824457

Int. Cl.[5] C07D *301/02*

U.S. Cl. 549—519 7 Claims

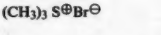
1. A process for the preparation of 2-(4-chlorophenyl ethyl)-2-tert.-butyloxirane of the formula



(I)

comprising

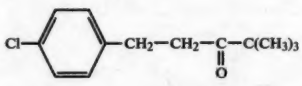
(a) mixing a solution of trimethylsulphonium bromide of the formula



(II)

in a methanol/toluene mixture with preheated toluene and simultaneously distilling off a methanol/toluene mixture at a temperature between 65° and 110° C. until a suspension having a solids content between 10 and 70% by weight is formed, and

(b) reacting the suspension of trimethylsulphonium bromide in toluene thus obtained with 1-(4-chlorophenyl)-4,4-dimethylpentan-3-one of the formula



(III)

in the presence of solid potassium hydroxide, diethylene glycol and water at a temperature between 20° and 120° C., the amounts of the reaction components being such that per mole of 1-(4-chlorophenyl)-4,4-dimethylpentan-3-one of the formula (III) there are present

between 1 and 2 moles of trimethylsulphonium bromide of the formula (II),

between 2 and 3 moles of solid potassium hydroxide and also

between 0.1 and 10% by weight of diethylene glycol and between 0.5 and 12% by weight of water, relative to 1-(4-chlorophenyl)-4,4-dimethylpentan-3-one of the formula (III).

4,988,830

PROPYLENE OXIDE PRODUCTION

Morris Gelb, Bryn Mawr; David W. Leyshon; John A. Sofranko, both of West Chester, and C. Andrew Jones, Newtown Square, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Jul. 28, 1989, Ser. No. 386,940

Int. Cl.[5] C07D *301/19*

U.S. Cl. 549—529 5 Claims

1. The process for the production of propylene oxide from saturated hydrocarbon having at least 4 carbon atoms which comprises:

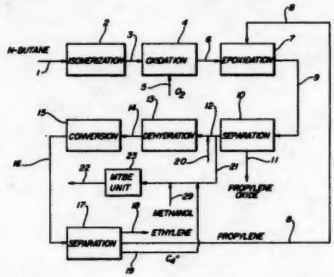
(a) oxidizing the said hydrocarbon to form a hydroperoxide having at least 4 carbon atoms;

(b) reacting said hydroperoxide and propylene at epoxida-

tion conditions to form propylene oxide and alcohol corresponding to the hydroperoxide;

(c) separating the thus formed propylene oxide and alcohol,

(d) converting at least a portion of the separated alcohol to



(e) feeding propylene formed in step (d) to the epoxidation of step (b).

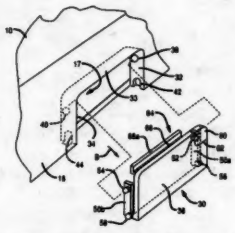
propylene and hydrocarbons having at least 4 carbon atoms; and

4,988,831

STRAIN RELIEF APPARATUS FOR RELIEVING STRAIN ON A CABLE OF AN ELECTRONIC DEVICE

Hillis L. Wilson, and Peter W. Yaichuk, both of Groton, N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Sep. 28, 1989, Ser. No. 413,657
Int. Cl.[5] H02G *15/07*
U.S. Cl. 174—65 R 13 Claims



1. A strain relief apparatus for relieving strain on a cable of an electrical device, said electrical device having a housing, said strain relief apparatus comprising:

a body which is generally planar, said body comprising a top portion and a bottom portion; and

mounting means secured to said bottom portion of said body for detachably mounting said body to the housing;

said body having a cable receiving means for receiving the cable and also for causing at least one bend in the cable so as to secure the cable to the body;

said cable receiving means restricting movement of the cable when the cable is received by the cable receiving means and the strain relief apparatus is mounted to the housing of the electrical device; and

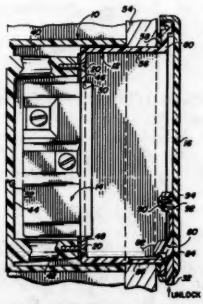
said cable receiving means including a generally U-shaped channel which is dimensioned to provide an interference fit for the cable in order to retain the cable in the cable receiving means; said generally U-shaped channel being secured to said top portion so as to coact with said housing in order to facilitate retaining the cable in the U-shaped channel when the strain relief apparatus is mounted to the housing of the electrical device.

4,988,832

RECESSED ELECTRICAL OUTLET WITH COVER

Michael J. Shotey, 7733 East Cypress, Scottsdale, Ariz. 85257

Continuation-in-part of Ser. No. 66,993, Jun. 29, 1987, Pat. No. 4,803,307. This application Oct. 31, 1988, Ser. No. 265,262
Int. Cl.[5] H02G *3/14*
U.S. Cl. 174—67 17 Claims



1. A wall mounted weather proof electrical outlet mountable essentially flush with the wall surface for receiving at least one electrical male plug having an electrical cord extending therefrom, which male plug is to be plugged into an electrical socket mountable in said electrical outlet, said outlet comprising in combination:

(a) a housing;

(b) means for securing said housing within the wall;

(c) a bracket for defining an opening to said housing, said bracket including means for sealing the junction between said bracket and the wall;

(d) means for interconnecting said housing with said bracket to mount the electrical socket and to locate the electrical socket a sufficient distance from the opening to accommodate the plugged in male plug between the electrical socket and the opening;

(e) means for covering the opening to enclose the plugged in male plug, said covering means being essentially flush with the adjacent wall surface;

(f) means for attaching said covering means with said bracket, including means for locking said covering means with said bracket, said locking means including a latch extending from side cover for engaging said bracket, bias means for biasing said latch against said bracket and a push button for releasing said latch from said bracket; and

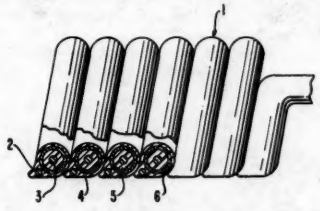
(g) means for accommodating passage of the electrical cord extending from the plugged in male plug to a remote location.

4,988,833

RETRACTABLE COILED ELECTRICAL CABLE

Vu A. Lai, Austin, Tex., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Aug. 29, 1989, Ser. No. 400,260
Int. Cl.[5] H01B *7/06*
U.S. Cl. 174—69 11 Claims



11. A coiled cable, which when said coil is stretched will retract into a coil when released, comprising:

(a) a round electrical cable;

(b) an electrically conductive shield surrounding said round electrical cable:

(c) at least one layer of electrically insulative material surrounding said shield; said round electrical cable, said shield and said at least one layer of insulative material surrounding said shield being formed into a coil having a plurality of coil turns; and

(d) one or more strands of retractable material imbedded in said at least one layer of insulative material surrounding said round electrical cable and positioned within said at least one layer of insulative material adjacent said round electrical cable such that said retractable material lies generally within the volume between the coil turns along the outer diameter of said coiled cable; said at least one layer of insulative material being shaped generally concentrically around said round electrical cable and said shield, but having a protrusion, in which said one or more strands of retractable material are imbedded, extending toward the adjacent coil turn in the spacial volume normally excluded between two adjacent coil turns.

4,988,834

CABLE SEALING SYSTEM

Laurie L. Birch, Newfoundland, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 28, 1989, Ser. No. 399,659
Int. Cl.[5] H02G 15/013
U.S. Cl. 174—93 7 Claims

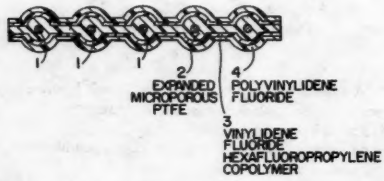
1. Apparatus for enclosing a cable comprising:
a housing including at least one surface adapted to permit a cable to pass therethrough; and
compliant means adjacent to at least one end surface, said means comprising a compliant member with integral front and back sections having substantially flat major surfaces in intimate contact prior to installation over a cable, each section including at least one removable ring in said major surfaces and at least one radial slit extending through said ring to an edge of each major surface, the slits of the two sections being sufficiently out of alignment to prevent any significant penetration of contaminants through said major surfaces, and the member being installable on a cable by opening both slits sufficiently to permit a cable to pass through the resulting opening formed in both sections of the member.

4,988,835

POLYVINYLIDENE FLUORIDE ELECTRICAL CABLE

Dinesh T. Shah, Chandler, Ariz., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Oct. 16, 1989, Ser. No. 421,895
Int. Cl.[5] H01B 7/08
U.S. Cl. 174—117 F 5 Claims



1. An electrical cable comprising:
(a) at least one conductive wire,
(b) an insulating layer surrounding the conductive wire, said insulating layer comprising expanded, microporous sintered polytetrafluoroethylene,
(c) a primer coating of a vinylidene fluoride-hexafluoropropylene copolymer surrounding the insulating layer.
(d) an outer coating covering and surrounding the primer coating comprising a film of polyvinylidene fluoride.

5. A process for making an electrical cable which comprises:
(a) applying microporous expanded polytetrafluoroethylene tape around a conductive wire to form an insulative coating of microporous, expanded polytetrafluoroethylene,
(b) subjecting the coated wire to a solution of a vinylidene fluoride-hexafluoropropylene copolymer and drying the resulting assembly.
(c) applying polyvinylidene fluoride around said resulting assembly in a manner that encapsulated said assembly.

4,988,836

DIGITIZER TABLET WITH INTEGRAL STORAGE

Wayne J. Murray, Bridgeport, Conn., assignor to Summagraphics Corporation, Seymour, Conn.

Filed Jul. 17, 1989, Ser. No. 381,071
Int. Cl.[5] G08C 21/00
U.S. Cl. 178—18 23 Claims

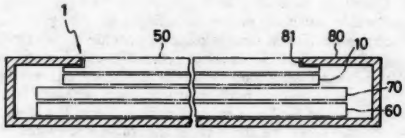
1. A digitizer tablet comprising:
a first side and an opposed second side, said first side including a digitizing surface; and
means defining a space associated with said opposed side for storing digitizer components therein.

4,988,837

POSITION DETECTING DEVICE

Azuma Murakami; Tsuguya Yamanami; Takahiko Funahashi; Toshiaki Senda; Kazuo Aoki; Keiichi Siguyama; Nobuyuki Miyamori; Akio Kikuchi, and Manabu Abe, all of Saitama, Japan, assignors to Wacom Co., Ltd., Saitama, Japan

Continuation of Ser. No. 283,713, Dec. 13, 1988. This application Apr. 30, 1990, Ser. No. 516,866
Claims priority, application Japan, Dec. 25, 1987, 62-328640; Apr. 15, 1988, 63-93219
Int. Cl.[5] G08C 21/00
U.S. Cl. 178—18 68 Claims



6. A position detecting device having:
a sensing section having light-transmission properties;
a position pointer for designating a position; and
a position detection control circuit for obtaining coordinate values of a position designated with said position pointer,
said position detection device comprising display means for displaying positional data obtained in said position detection control circuit as coordinates corresponding to the coordinates of said designated position, said display means being superposed over said sensing section, said display means having a back light disposed below said display means to illuminate the same from below, thus constituting a tablet.

4,988,838

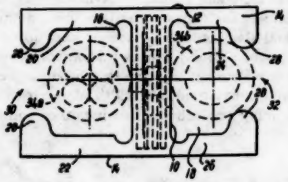
LINE PROTECTING APPARATUS

Dennis A. Kirtland, Ashby-de-la-Zouch, United Kingdom, assignor to W. H Dunn & Son Limited, Leicestershire, England

Filed Nov. 17, 1988, Ser. No. 276,291
Claims priority, application United Kingdom, Jan. 26, 1988, 8801707
Int. Cl.[5] F16L 3/08
U.S. Cl. 191—12 C 28 Claims

1. Apparatus for protecting cables and service lines, said apparatus comprising means defining at least one open topped channel in which a line can locate, each side of the channel having a substantially planar outer surface which has a width towards a base of the channel and substantially the same width towards the entrance thereof to enable the line to locate in the channel substantially over the width of the channel sides, at least a first of the channel sides having means projecting in-

wardly of, and extending linearly substantially over the width of said first side to define with the opposed side of the channel an entrance to the channel of a width less than that of the channel, and less than the respective dimension of the line, and



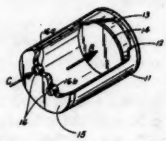
one channel side being resiliently movable, whereby to enable the line to be inserted through the channel entrance by outward movement of said one channel side, and to be retained in the channel by the projecting means on return inward movement thereafter of said one channel side.

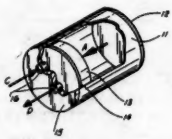
4,988,839

MOMENTUM ACTIVATED ELECTRICAL SWITCH

Joseph W. Kennicott, 4708 Huron Dr., Pensacola, Fla. 32507

Filed Sep. 5, 1989, Ser. No. 402,772
Int. Cl.[5] H01H *35/14*
U.S. Cl. 200—61.45 M **4 Claims**





1. A momentum activated electrical switch, comprising:

(a) a switch body;

(b) a first end of said body formed from ferrous material defining first detent in said switch body;

(c) a second end of said switch body formed from non-magnetic and electrically non-conductive material having two spaced-apart ferrous electrically conductive rods extending therethrough, an exterior end of each of said rods outside said switch body for connecting to an electrical circuit, an interior end of each of said rods inside said switch body cooperating together to define a second detent within said switch body adjacent said second end;

(d) a magnet positioned in said switch body and movable between said first and second detents by a combined acceleration and deceleration of said switch body sufficient to break the detaining force between said magnet and said respective detent; and,

means associated with said magnet for connecting said rods in electrical communication when said magnet is positioned at said second detent,

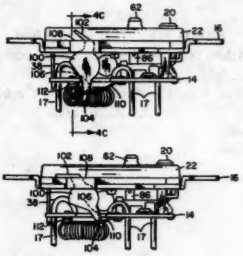
whereby said electrical switch is open when said magnet is at said first detent and closed when said magnet is at said second detent.

4,988,840

CONTROL SWITCH

Steven R. Carson, Upper Saddle River, N.J.; Raymond T. Griffin, and Scott A. Spear, both of San Antonio, Tex., assignors to Lightolier, Inc., Secaucus, N.J.

Division of Ser. No. 160,358, Feb. 23, 1988, Pat. No. 4,880,950. This application Nov. 13, 1989, Ser. No. 434,884
Int. Cl.[5] H01R *33/96*
U.S. Cl. 200—334 **3 Claims**



1. A safety device in a control switch having a frame, a printed circuit board, and a front cover, the safety device comprising:

a butt contact mounted on said printed circuit board;

an actuator arm having first and second ends, said first end being mounted on said printed circuit board proximate said butt contact, and said second end being forcibly urged against said butt contact when said actuator arm is in its relaxed state, said butt contact and said actuator arm forming an override on-off switch;

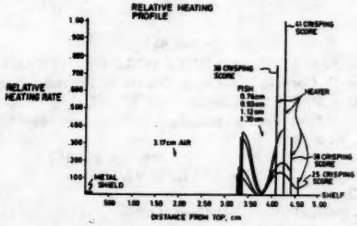
means for maintaining said actuator arm in an open position until said front cover is placed on said control switch, thereby preventing accidental electrical shock prior to installation.

4,988,841

MICROWAVE FOOD PRODUCTS AND METHOD OF THEIR MANUFACTURE

Peter S. Pesheck, Brooklyn Center; William A. Atwell; Madonna M. Krawiecki, both of Andover, and George R. Anderson, Minneapolis, all of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Division of Ser. No. 85,125, Aug. 13, 1987, which is a continuation-in-part of Ser. No. 903,007, Sep. 2, 1986, Pat. No. 4,926,020. This application Sep. 15, 1989, Ser. No. 410,557
Int. Cl.[5] H05B *6/64*
U.S. Cl. 219—10.55 M **19 Claims**



1. A method of making a food product for heating in a microwave oven, said method including:

(a) selecting at least one food product;

(b) determining a time/temperature relationship range for said at least one food product to follow during heating in a microwave oven;

(c) determining a temperature range for said at least one food

product to be heated to within during exposure to microwave radiation; and

(d) analyzing the performance characteristics of said at least one food product using interference analysis techniques and using results of said analysis to make an adjustment in said at least one food product whereby said at least one food product will generally heat within said time/temperature relationship range and reach a temperature generally within said temperature range.

4,988,842

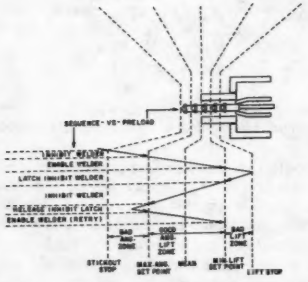
STUD WELDING SYSTEM

Kent E. Van Allen, New Baltimore, Mich., assignor to Emhart Inc., Towson, Md.

Filed Feb. 12, 1990, Ser. No. 478,653

Int. Cl.[5] B23K *9/20*

U.S. Cl. 219—98 **4 Claims**



1. An arc stud welding system comprising a stud welding gun including

a D.C. lift solenoid having a stator having a coil and armature means including stud gripping means for lifting said stud gripping means away from a workpiece,

said armature means being displaceable from a lift stop position where said armature means engages said stator, sequentially through a minimum lift gap position spaced from said lift stop position and maximum lift gap position to a full stickout position beyond said maximum lift gap position,

a trigger displaceable to a selected position to issue a trigger signal,

means for receiving said trigger signal and for issuing a start to weld signal if said armature means is located between said minimum and maximum lift gap positions, and

means for receiving said trigger signal but not issuing a start to weld signal if said armature means is located between said lift stop position and said minimum lift gap position or between said maximum lift gap position and said full stickout position.

4,988,843

ELECTRICAL FLASH BUTT WELDING APPARATUS

William D. Cornell, Finksburg; Donald E. Rexrode, Baltimore; Delmer B. Wolfe, Abingdon, all of Md., and Nicholas D. Remy, Allentown, Pa., assignors to Bethleham Steel Corporation, Bethlehem, Pa.

Filed Jan. 4, 1990, Ser. No. 461,151

Int. Cl.[5] B23K *11/04*

U.S. Cl. 219—100 **2 Claims**

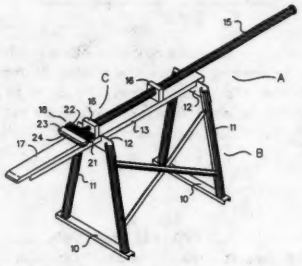
1. A method for flash butt welding the ends of metal strip on a continuous strip mill the steps, comprising:

(a) shearing the trailing end of the first strip,

(b) shearing the leading end of the second strip,

(c) removing said first strip from between the spaced open opposed electrodes of a flash butt welding apparatus,

(d) reciprocally conveying between the horizontal flat parallel contact surfaces of said spaced open opposed electrodes a cleaning means capable of simultaneously engaging and cleaning debris from the horizontal flat parallel contact surfaces of both electrodes the cleaning means comprising an upper cleaning means said upper cleaning means including a plate having a width substantially equal to the horizontal contact surface width of the upper electrode and including a plurality of upward extending cleaning members for engaging and cleaning debris from the horizontal flat contact surface of said upper electrode, and, a lower cleaning means said lower cleaning means including a plate having a width substantially equal to the horizontal contact surface width of the lower electrode and including a plurality of downward extending cleaning



members for engaging and cleaning debris from the horizontal flat contact surface of said lower electrode,

(e) removing said cleaning means from between the horizontal flat parallel contact surfaces of said spaced open opposed electrodes, and

(f) inserting between said spaced open opposed electrodes the trailing end and the leading end of said first strip and second strip, butting together the trailing end and the leading end of said first and second strip, and, activating said means for moving said electrodes from a spaced open inactive position to a closed welding position in contact with the top and bottom surfaces of said first and second metal strip.

4,988,844

PROCESS FOR CONTROLLING THE STRIKE POSITIONS OF A PLURALITY OF ELECTRON BEAMS ON A MELTING BATH

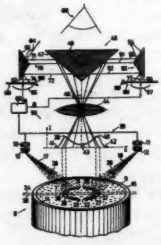
Walter Dietrich, Hanau; Horst Ranke, Alzenau; Herman Stumpp, Kahl, and Claus Heuser, Alzenau, all of Fed. Rep. of Germany, assignors to Leybold A.G., Fed. Rep. of Germany

Filed Feb. 16, 1990, Ser. No. 480,807

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1989, 3923899

Int. Cl.[5] B23K *15/00*

U.S. Cl. 219—121.17 **12 Claims**



1. A process for controlling positions of strike points of a plurality of electron beams on a melting bath, wherein electromagnetic radiation occurs which is greater at the strike points

than in a field surrounding the strike points, comprising the steps of:

sensing the electromagnetic radiation at as many different locations on a surface of the melting bath as there are electron beams;

dividing the electromagnetic radiation into partial beams; and,

guiding deflection of the electron beams based on a difference between the partial beams.

4,988,845

DEVICE TO CUT AND BUTT-WELD BANDS OR METAL SHEETS HAVING LIMITED DIMENSIONS

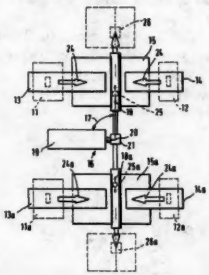
Helmut Bauer, Karben, and Gunter Wilkens, Kelkheim, both of Fed. Rep. of Germany, assignors to Oxytechnik Gesellschaft, Fed. Rep. of Germany

Filed Jun. 15, 1990, Ser. No. 538,775

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1989, 3920825

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.63 15 Claims



1. In a device to cut and butt-weld bands or metal sheets having limited dimensions with a laser device and with shears, which have two shearing blades facing downwards and arranged at a certain distance from each other on a pivoting shearing beam, and these blades carry out an essentially vertical cutting motion, the improvement being in that the bands or metal sheets are clamped onto a backing strip positioned on the upper side of said shearing beam by means of clamping jaws, and a laser beam decoupled from a laser resonator for welding the bands or metal sheets.

4,988,846

CONTACT TIP FOR ARC WELDING APPARATUS

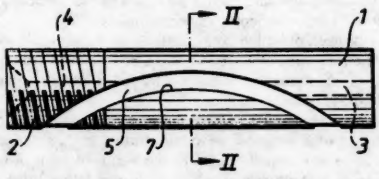
Karl-Ola Karlsten, Örebro, and Bertil Larsson, Laxå, both of Sweden, assignors to ESAB Aktiebolag, Gothenburg, Sweden

Filed Mar. 5, 1990, Ser. No. 489,475

Claims priority, application Sweden, Mar. 7, 1989, 8900781

Int. Cl.[5] B23K *9/26*

U.S. Cl. 219—137.61 19 Claims



1. A contact tip for use in arc welding devices, said contact tip comprising structure having at least one groove on a side thereof, said structure having means for passing therealong and making contact with a wire electrode and for supplying welding current to the wire electrode;

said means for passing comprising a guide channel

said at least one groove having at least one substantially convex surface projecting into the guide channel; and

a wall of said groove forming at least a portion of said guide channel.

4,988,847

ELECTRICALLY HEATED AIR BLOWER UNIT FOR DEFOGGING BATHROOM MIRRORS

Harry J. Argos, 2928 E. Virginia Ave., W. Covina, Calif. 91791, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

Filed Sep. 2, 1986, Ser. No. 902,510

Int. Cl.[5] H05B *1/00;* E06B *7/12;* F24H *3/04*

U.S. Cl. 392—363 1 Claim

1. An apparatus for defogging a bathroom mirror on a wall comprising:

(a) a pair of spaced apart bracket units adapted to be secured to said wall adjacent and above opposite ends of the upper portion of a mirror, each bracket including a wing bolt;

(b) an elongated housing mounted longitudinally between said bracket units by said wing bolts and adapted to be suspended outwardly from the mirror, said housing having an upper elongated air outlet port and a lower elongated air outlet port;

(c) an elongated filter mounted within said housing directly below said air inlet port to prevent foreign objects from entering said housing;

(d) an electric motor disposed within said housing;

(e) a longitudinal squirrel and fan rotatably mounted within said housing and operated by said motor to draw ambient air into said housing through said air inlet port and to discharge air from said housing through said air outlet port;

(f) an elongated electrical resistance-type heating element mounted within said housing directly above said air outlet port to warm said air before it is discharged from said housing;

(g) a plurality of longitudinal louvers mounted within said air outlet port of said housing for directing flow of said warm air in a direction toward the mirror for defogging the mirror;

(h) a plurality of heating elements each of which is mounted to a different one of said louvers;

(i) said louvers being adjustably mounted within said air outlet port of said housing; and

(j) and elongated control rod transversely placed and pivotly connected therealong to each forward end of said louvers to manually change the angle of said louvers simultaneously by a push-pull manipulation thereby providing for adjustment of the louvers in said outlet port.

4,988,848

CERAMIC HEATER ELEMENT FOR DUAL ZONE SPRUE BUSHING

Panos Trakas, 21 W. Wrightwood, Glendale Heights, Ill. 60139

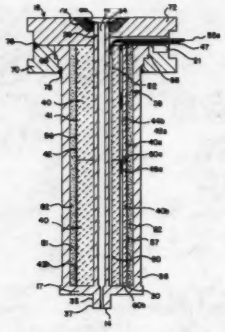
Division of Ser. No. 393,476, Aug. 14, 1989, Pat. No. 4,899,435, which is a division of Ser. No. 250,769, Sep. 28, 1988, Pat. No. 4,882,469. This application Oct. 30, 1989, Ser. No. 428,968

Int. Cl.[5] B29C *45/00;* H05B *1/00*

U.S. Cl. 219—421 5 Claims

1. A ceramic heater element intended for use in a sprue bushing having an internally heated melt passageway which axially extends through an elongated inner core of the sprue bushing, the elongated inner core extending between an inlet end and outlet end thereof, said sprue bushing having a dual zone heating means disposed in an annular compartment axially extending between the elongated inner core and an exterior sidewall of an outer casing of said sprue bushing, said ceramic heater element comprising a hollow sleeve having a

predetermined axial length, the hollow sleeve containing three passages axially extending therethrough and circumferentially spaced apart within said hollow sleeve, the passages being adapted to receive therein a preselected length of resistance wire said hollow sleeve further including two axial slots extending the length of said sleeve, the axial slots being disposed on an inner surface of said hollow sleeve, each of said slots being adapted to slidingly receive a thermowell therein, such that the thermowell is held by said hollow sleeve against said sprue bushing elongated inner core.



4,988,849

FINANCIAL TRANSACTION SYSTEM

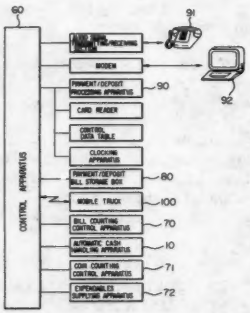
Shigeru Sasaki, Ibaraki; Masataka Kawauchi, Ishioka, and Yasunori Hamada, Tsuchiura, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,301

Claims priority, application Japan, Apr. 10, 1987, 62-86865

Int. Cl.[5] G06F *15/30*; G06K *7/00*

U.S. Cl. 235—379 **6 Claims**



1. A transaction processing system comprising:

first means for receiving precontract data relating to a precontract of a financial transaction, said precontract data being transmitted from a customer and including at least a time schedule when the customer intends to carry out the precontract and information relating to the customer and the transaction, judging whether the precontract is allowable and registering the precontract data when it is judged that the precontract is allowable;

second means for permitting a customer to input data including at least information identifying the customer;

means including a plurality of delivering/receiving units, each adapted for delivering to or receiving from any customer medium of the financial transaction;

third means for comparing the precontract data registered in said first means with the data inputted by the customer through said second means when said data is inputted at a time corresponding to said schedule time, and selecting one of said delivering/receiving units when said inputted data agrees with said precontract data so that the customer is allowed to use said one delivering/receiving unit for delivering to or receiving from the customer the medium of the financial transaction based on the precontract.

4,988,850

MAGNETORESISTANCE ELEMENT ARRAY

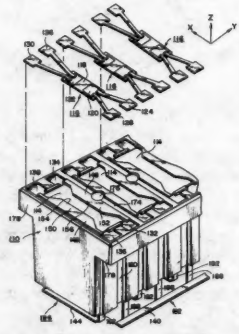
Noboru Masuda, Saitama; Tetsuo Oosawa, Tokyo, and Kenji Tomaki, Kanagawa, all of Japan, assignors to Murata Mfg. Co., Ltd., Kyoto, Japan

Filed May 17, 1989, Ser. No. 353,447

Claims priority, application Japan, May 25, 1988, 63-69030[U]; May 27, 1988, 63-70067[U]

Int. Cl.[5] G06K *7/08*

U.S. Cl. 235—449 **18 Claims**



1. A magnetoresistance element array having a stem composed of a rectangular hollow casing with the interior thereof divided by partition walls, magnets inserted into said stem, magnetic detectors each of which is composed of a magnetoresistance element the resistance value of which varies in accordance with the magnetic field supplied from the outside, an element substrate with said magnetoresistance element provided on a part of the surface thereof, power source terminals and output terminals lead from said magnetoresistance element and external connecting terminals for connecting said power source terminals and said output terminals to the outside, said magnetoresistance element array comprising:

top walls each of which connects the side walls of said stem in the longitudinal direction like a bridge and the underside of which the top portions of said magnets are brought into close contact with; and

guides which are formed from an opposing pair of said top walls in such a manner as to constitute a guide gap therebetween substantially equal to the width of each of said magnetic detectors and which have regulating sides for regulating the position at which each of said magnetic detectors is secured to the top portion of each of said magnets.

4,988,851

APPARATUS FOR READING COMMODITY DATA HAVING AN ADJUSTABLE BAR CODE READER

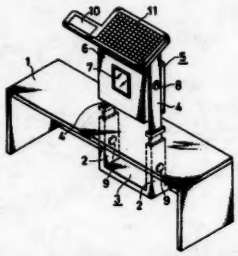
Mitsunori Kohno; Takao Umebara; Yukuo Kurimoto; Nobuhiko Fujii, and Hiromasa Akita, all of Shizuoka, Japan, assignors to Tokyo Electric Company, Ltd., Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,643

Claims priority, application Japan, Sep. 22, 1987, 62-144898[U]; Jul. 12, 1988, 63-172900

Int. Cl.[5] G06K 7/01, 9/18

U.S. Cl. 235—462 4 Claims



1. An apparatus for reading commodity data comprising:

a support member comprising first and second opposing vertically extending members;

first and second elevating members slidably positioned, for vertical upward and downward movement, within apertures in each of said first and second vertically extending members;

a bar code reader defining a reader body and having a reading window provided on one face of said reader body, said bar code reader being rotationally mounted between said first and second elevating members;

a keyboard mounted on top of said first and second elevating members;

first fastening means for adjusting the rotational position of said bar code reader, said first fastening means being located on at least one of said first and second elevating members; and

second fastening means for adjusting the vertical positioning of said first and second elevating members and thereby said bar code reader and said keyboard attached thereto, said second fastening means being located on at least one of said first and second vertically extending members;

wherein said bar code reader is adjustable to a plurality of rotational and vertical positions, and said keyboard is adjustable to a plurality of vertical positions.

4,988,852

BAR CODE READER

Kalyan V. Krishnan, Fremont, Calif., assignor to Teknekron Transportation Systems, Inc., Berkeley, Calif.

Continuation of Ser. No. 215,110, Jul. 5, 1988, abandoned. This application Mar. 19, 1990, Ser. No. 496,167

Int. Cl.[5] G06K 7/10

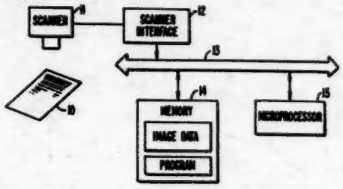
U.S. Cl. 235—462 11 Claims

MICROFICHE APPENDIX INCLUDED

(1 Microfiche, 83 Pages)

1. A method of automatically detecting a bar code or the like on a document from an image of the document, said bar code being disposed at an unknown position on the document and said image being represented by a pixel array, comprising the steps of;

automatically locating a candidate bar code within a portion of said pixel array:



defining a baseline of said candidate bar code; and

decoding said bar code in the direction of said baseline.

4,988,853

TICKET CHECKING/ISSUING APPARATUS IN WHICH FRICTION HOLDS A TICKET WHILE RECORDING/REPRODUCING DATA

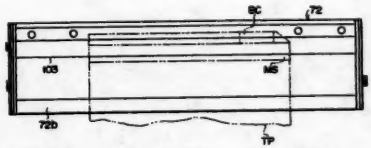
Masayoshi Nagashima, Chigasaki, and Shinichi Kawahara, Sagamihara, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 27, 1988, Ser. No. 263,171

Claims priority, application Japan, Nov. 13, 1987, 62-288137

Int. Cl.[5] G06K 7/08, 7/15

U.S. Cl. 235—475 8 Claims



1. Data recording unit, for apparatus which issues tickets on which data is recorded, comprising:

means for holding the ticket;

means for recording data on the ticket;

means for conveying the ticket into and out of said holding means through said recording unit;

means for moving said recording means along said holding means and bringing said recording means into sliding contact with the ticket when the ticket is held by said holding means; and

a friction member which is arranged on a surface of said holding means opposing said recording means so as to frictionally hold the ticket against said holding means, said friction member having a friction coefficient between itself and the ticket larger than that between said recording means and the ticket;

wherein said moving means brings said recording means into sliding contact with said friction member when said recording means is moved while said holding means does not hold a ticket, and said moving means brings said recording means into contact with the ticket when said holding means holds the ticket by means of said friction member.

4,988,854

TEMPERATURE COMPENSATING CARD CONVEYOR

Katsuya Mita, Kyoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Nov. 21, 1988, Ser. No. 274,341

Claims priority, application Japan, Nov. 26, 1987, 62-298471

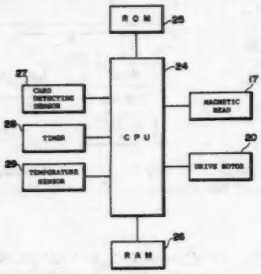
Int. Cl.[5] G06K 7/01, 13/04

U.S. Cl. 235—476 2 Claims

1. A card reader which has a card conveying path to sandwich and convey a card between surfaces of a pair of opposite

conveying belts reeved around pulleys and which processes card data by a card processing section arranged on said card conveying path, said card reader comprising:

means for detecting the operating status of said card reader



which produces a signal when said status exceeds a threshold; and

control means connected to said detecting means for racing said drive motor for a predetermined period of time to prevent deformation of the belts in response to said signal.

4,988,855

PORTABLE ELECTRONIC APPARATUS

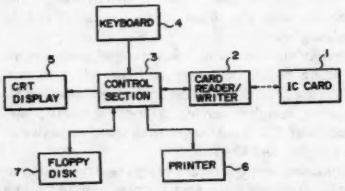
Yasuo Iijima, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 23, 1989, Ser. No. 397,194

Claims priority, application Japan, Aug. 26, 1988, 63-211834

Int. Cl.[5] G06K *19/06*

U.S. Cl. 235—492 5 Claims



1. A portable electronic apparatus comprising:

a memory divided into a plurality of areas;

control means for controlling an access to said memory and selectively exchanging data with an external device;

key data storage means for storing a plurality of key data;

collation means for collating at least one of the plurality of key data with a plurality of second key data selectively input from the external device;

collation result storage means for storing collation results of said collation means in units of the plurality of key data;

first access control means for enabling access to an area of said memory when one of the collation results stored in said collation result storage means is affirmative; and

second access control means for enabling an access to the area when all the collation results stored in said collation result storage means are affirmative.

4,988,856

AUTOMATIC FOCUSING APPARATUS OF A CAMERA FOR PHOTOGRAPHING MOVING OBJECTS

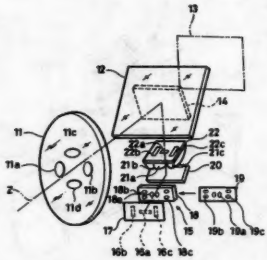
Masataka Hamada; Tokuji Ishida, and Hiroshi Ootsuka, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 12, 1989, Ser. No. 351,167

Claims priority, application Japan, May 13, 1988, 63-117439

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.8 20 Claims



1. An automatic focusing apparatus of a camera comprising:

focus detecting means for detecting repeatedly focus conditions of a photographic lens and outputting successively focus signals corresponding to the focus conditions,

drive means for driving said photographic lens for focus adjustment,

predicting means of predicting an in-focus point from the plurality of focus signals outputted from said focus detecting means,

control means for controlling said drive means to drive said photographic lens toward the in-focus point predicted by said predicting means,

auxiliary light projecting means for projecting auxiliary light onto an object for detection operation of said focus detecting means,

mode selecting means for selecting a first mode in which focus detection is performed under projection of the auxiliary light and a second mode in which focus detection is performed under non-projection of the auxiliary light, and

forbidding means for forbidding the control of the drive by said control means when the first mode is selected by said mode selecting means.

4,988,857

MISCONVERGENCE MEASURING APPARATUS

Takumi Karasawa, Sakura; Michio Tsukii; Takashi Atobe, both of Mobara; Takaaki Ishikawa, Sakura, and Kazuhiko Mizuno, Kashiwa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 4, 1989, Ser. No. 347,216

Claims priority, application Japan, May 6, 1988, 63-108984; Jun. 22, 1988, 63-152284; Aug. 31, 1988, 63-214978; Sep. 16, 1988, 63-229957

Int. Cl.[5] G01J *1/32*

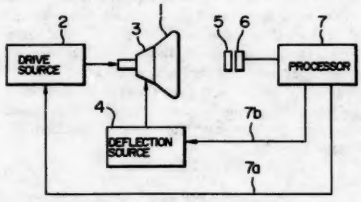
U.S. Cl. 250—205 14 Claims

1. A misconvergence measuring apparatus comprising:

a photoelectric transducer of split light-sensitive structure disposed in front of a phosphor screen of a color Braun tube with a deflection yoke mounted;

a deflection source for supplying to said deflection yoke an output waveform which deflects the electron beams of said color Braun tube by a constant unit at a time; and

a processor for detecting the position of a bright point on said phosphor screen where the output of said photoelectric transducer becomes the maximum, and for controlling said deflection source.



4,988,858

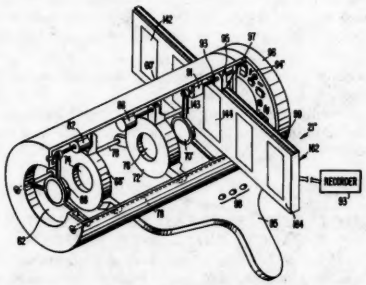
CATOPTRIC MULTISPECTRAL BAND IMAGING AND DETECTING DEVICE

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 929,356, Nov. 12, 1986, Pat. No. 4,812,030, which is a continuation-in-part of Ser. No. 688,535, Jan. 3, 1985, abandoned. This application Jun. 29, 1989, Ser. No. 372,772

Int. Cl.[5] G01J *3/50;* **G02B** *5/10*

U.S. Cl. 250—208.1 **24 Claims**



1. A catoptric optical device comprising:

reflector set means for transforming received object energy into a real image of /said object, said set means having a variable focal length and including a plurality of axially-spaced reflector means for coaxially receiving and reflecting said energy;

magnifying means for selectively varying the focal length of said reflector set means;

a plurality of spaced electromagnetic radiation detectors;

means for mounting said plurality of detectors in a predetermined spaced array;

means for moving said mounting means to selectively position a selected one of said detectors in alignment with the image generated by said reflector set means; and

focusing means for selectively varying the axial distance between said reflector set means and said selected one of said detectors.

4,988,859

OPTICAL WAVEFORM MEASURING DEVICE

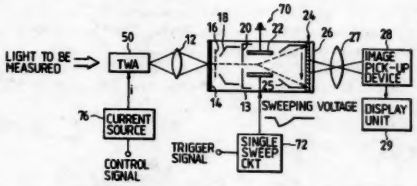
Yutaka Tsuchiya, and Shinichiro Aoshima, both of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 11, 1989, Ser. No. 350,273

Claims priority, application Japan, May 13, 1988, 63-116732

Int. Cl.[5] H01J *31/50*

U.S. Cl. 250—213 VT **29 Claims**



1. An optical waveform measuring device, comprising:

an optical amplifier to which a light beam under measurement is applied, said light beam under measurement having an original wavelength and said amplifier amplifying the intensity of said light beam under measurement at or near said original wavelength;

a photodetector having means for generating an electron image in response to an amplified light beam generated by said optical amplifier in response to said light beam under measurement.

4,988,860

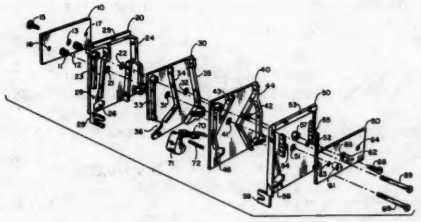
ELECTRONIC TRIGGER FOR PREPAY TYPE TELEPHONE PAYSTATIONS

William M. Wollet, Huntsville, and Gary Grantland, Hartselle, both of Ala., assignors to Palco Telecom Inc., Nashville, Tenn.

Filed Mar. 9, 1990, Ser. No. 491,052

Int. Cl.[5] G01N *9/04*

U.S. Cl. 250—223 R **11 Claims**



1. A trigger switch for use in a coin operated device comprising:

a plurality of light sources;

a plurality of light detectors;

a plurality of coin conducting elements positioned adjacent to each other, all of said elements being positioned between said light sources and said light detectors;

each of said elements including a plurality of means allowing transmission of light from said light sources to pass through said elements to said light detectors;

each of said elements facilitating the passage of a different single value of coin through said element;

and a common trigger mechanism associated with all of said coin conducting elements including a portion projecting into each of said elements and further including a cam counterweight;

the passage of a coin through any of said elements effective

to block the transmission of light from at least one of said light sources to at least one of said light detectors and to operate said trigger mechanism, said common trigger mechanism cam counterweight operated in response to said passage of a coin through any of said channels to provide an actuating force for an associated coin relay.

4,988,861

DEVICE FOR MEASURING THE ENERGY OF AN ELECTRIC ARC

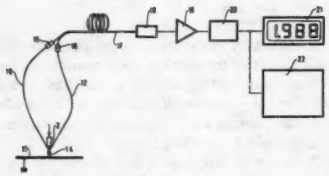
Roland Hakoun, Domont, and Pascal Repain, Chatou, both of France, assignors to Societe Anonyme dite: Compagnie Lyonnaise De Transmissions Optiques, Chichy, France

Filed May 18, 1989, Ser. No. 353,595

Claims priority, application France, May 24, 1988, 88 06877

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.11 7 Claims



1. Device for measuring the energy of an electric arc, comprising:

(a) a support for at least one optical fiber, disposed on the head of an electrode of the arc, made of a plastic material having sufficient dielectric strength that it will not disturb the operation of the arc,

(b) at least one optical fiber secured on said support and having an end adjacent to the tip of the electrode,

(c) an optical connector receiving the other end of the optical fiber and one end of an optical fiber cable for connecting with a photoelectric cell,

(d) a photoelectric cell disposed at a sufficient distance from the electrode to be immune to disturbances due thereto, and

(e) an electronic means connected to the photoelectric cell for recording and displaying the energy given off by the arc.

4,988,862

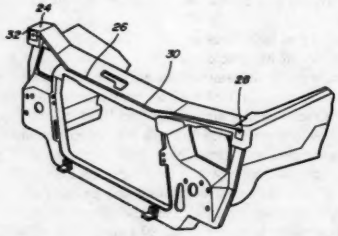
OPTICAL OCCUPANT RESTRAINT ACTIVATION SENSOR

Dale L. Beltz, Northville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Sep. 27, 1989, Ser. No. 413,362

Int. Cl.[5] G01D *5/34;* B60R *21/32*

U.S. Cl. 250—227.15 10 Claims



1. An occupant restraint activation sensor for an automotive vehicle having a body, the sensor comprising:

a light source carried on said vehicle;

a light transmission module extending laterally across a frontal area of said vehicle in optical communication with said light source; and

a photo responsive detector in optical communication with said light transmission module, said light transmission module being supported on structural body members of said vehicle, the substantial deflection thereof being indicative of the occurrence of the imposition of a predetermined impact load on the vehicle body and being operative in response to said load imposition to fracture said light transmission module, thereby severing optical communication between said light source and said photo responsive detector.

4,988,863

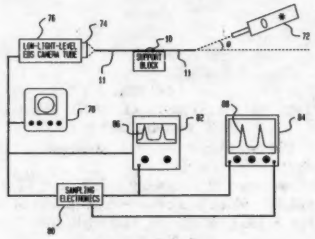
OPTICAL FIBER REFRACTOMETER LAUNCHING LIGHT AT A NON-ZERO LAUNCH ANGLE

Lloyd C. Bobb, Warminster, and Howard D. Krumboltz, Chalfont, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 3, 1990, Ser. No. 460,436

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.25 6 Claims



1. A method for measuring the index of refraction of a liquid with an optical fiber refractometer having a light transmitting optical fiber with a fiber axis, comprising;

immersing a portion of said optical fiber in said liquid,

launching light into a first end of said optical fiber at a selected non-zero launch angle with respect to said fiber axis,

detecting transmitted light at a second end of said optical fiber, and

determining the index of refraction of said liquid in accordance with said detected light and said selected non-zero launch angle.

4,988,864

PHOTOELECTRIC ANGLE MEASURING DEVICE WITH ADJACENT ORDER INTERFERENCE

Dieter Michel, and Walter Huber, both of Traunstein, Fed. Rep. of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,466

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1989, 3901534

Int. Cl.[5] G01D *5/34;* G01B *11/02*

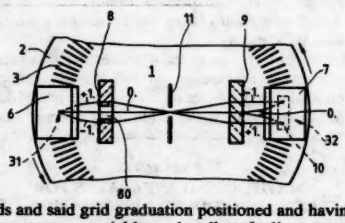
U.S. Cl. 250—231.16 14 Claims

1. A photoelectric measuring device for measuring the position of a first object rotatably movable with respect to a second object comprising:

a graduation support to which the first object can be connected, said graduation su having a grid graduation, and further in which said graduation comprises a first graduation zone second graduation zone diametrically opposite to first graduation zone,

a scanning unit to which the second object can be connected, said scanning unit positioned to scan with a beam of light said first graduation zone to direct partial beam bundles into interference on said second graduation zone,

a photodetector positioned to measure interfering partial beam bundles on said second graduation zone, and diffraction grids in the beam path between said first graduation zone and said second graduation zone, said diffraction



grids and said grid graduation positioned and having grid parameters so partial beam bundles of adjacent orders of diffraction are brought into interference on said second graduation zone.

4,988,865

DEVICE FOR DETERMINING THE ANGULAR POSITION OF THE DRIVE SHAFT IN A SEWING MACHINE

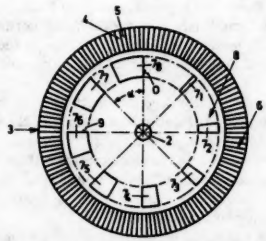
Thomas Schmidt, Rauenberg; Bernd Olbrich, Ketsch; Gerd Nohl, Rauenberg, and Gustav Rohr, Nussloch, all of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH & Co KG Fabrik für Elektromotoren u. elektrische Apparate, Schwetzingen/Baden, Fed. Rep. of Germany

Filed Mar. 17, 1989, Ser. No. 325,325

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809569

Int. Cl.[5] G01D *5/34*

U.S. Cl. 250—231.16 **14 Claims**



1. Position signaling device, especially for industrial sewing machines, having a rotatably mounted slotted wheel which can be coupled with a drive shaft of the machine and which has a plurality of equally wide and equidistantly disposed slots and lands forming a first circular track, the width of each slot being defined by circumferentially opposed edges, and first and second fixed slotted masks disposed in back of the slotted wheel in the axial direction, offset from one another circumferentially by a defined angle, and aligned with the first track parallel to said axis, each comprising slots and lands corresponding to the division of the slotted wheel, and having a first light emitter and a first light receiver associated with said first mask and a second emitter and a second receiver associated with said second mask, an emitter being located on one side of each mask and a receiver being located on the other side of the wheel from said mask, a first electronic evaluating system for determining the rotatory speed and the angle of rotation according to the number of counted light pulses caused by the slots, and for determining the direction of rotation according to the phase shift of the signals on the basis of the angular offset of the slotted masks, characterized in that the slotted wheel (3) has a second plurality of slots (7) forming a second circular track, which are offset radially from the first track (6), the slots (7) of the second track (8) having slot widths (W_i) differing in the circumferential direction, and a third light emitter (11*c*) and a third light receiver (12*c*) being provided for the second track (8), while during the pulse duration (window width) of the third receiver (12*c*) corresponding to a particular slot width (W_i) a second electronic evaluation system (28) connected to the first (14) is connected to the output of the third light receiver (12*c*) to count the light pulses or light pulse flanks of the first or second receiver (12*a* or 12*b*) for the identification of the corresponding slot (7*i*) of the second track and thus the angular position of the slotted wheel.

4,988,866

MEASURING DEVICE FOR CHECKING RADIATION FIELDS FROM TREATMENT MACHINES FOR RADIOTHERAPY

Kjell B. Westerlund, Mälarvägen 8, S-756 53 Upsala, Sweden

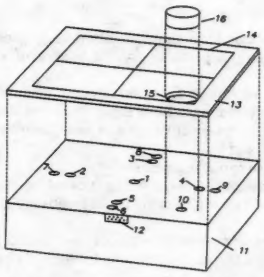
PCT No. PCT/SE88/00385, § 371 Date Jan. 19, 1990, § 102(e) Date Jan. 19, 1990, PCT Pub. No. WO89/00703, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 19, 1988, Ser. No. 458,628

Claims priority, application Sweden, Jul. 21, 1987, 8702926

Int. Cl.[5] G01T *1/161*; A61N *5/10*

U.S. Cl. 250—252.1 **3 Claims**



1. A measuring device for checking of radiation fields from treatment machines for radiotherapy, comprising a measuring block (11) containing radiation detector means (1–10) arranged under a cover plate (13) provided with field marking lines (14) and energy filter means (16), said detector means being connected to readout means for signal processing and presentation of measurement values, characterised in that said radiation detector means comprising:

total dose detector means (1) centrally located in the measuring block (11) for checking dose monitor calibration, homogeneity detector means (2–5) located between the central detector means (1) and the edges of the measuring block (11) for determination of the beam homogeneity by comparing the reading thereof with those of the total dose detector means (1),

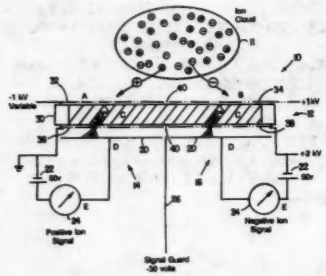
edge detector means (6–9) for determination of the geometrical correspondence between the radiation field and the light field for setup of the radiation field by comparison of the readings thereof with those of the total dose detector means (1), and

energy detector means (10) arranged below said energy filter means (16) for determination of the beam energy by comparison of the readings thereof with those of the total dose detector means (1),

the arrangement of the radiation detectors (1–10) in the block (11) and the signal processing in the readout means being such that the dose monitor calibration, the homogeneity of the radiation field, the geometrical correspondence of the radiation field and the light field, and the energy of the radiation of the treatment machine can be checked simultaneously in one single irradiation of the

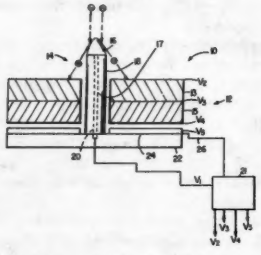
measuring block (11) and subsequent reading of the measurement results.

4,988,867
SIMULTANEOUS POSITIVE AND NEGATIVE ION DETECTOR
Bruce N. Laprade, Holland, Mass., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.
Filed Nov. 6, 1989, Ser. No. 432,530
Int. Cl.[5] H01J 49/00
U.S. Cl. 250—281 6 Claims



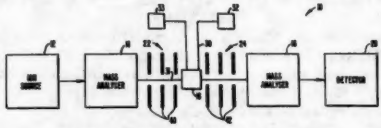
1. An apparatus for simultaneously detecting positively and negatively charged particles from a source of said particles comprising
a detector including first and second microchannel plate (MCP) sections that have input locations that are generally parallel to each other and both face said source of particles, and
a plurality of input segments,
at least one input segment being located on said first MCP section and biased to attract said positively charged particles,
at least one input segment being located on said second MCP section and biased to attract said negatively charged particles,
said detector providing simultaneously positive and negative outputs indicating said attracted separated positively and negatively charged particles.

4,988,868
ION DETECTOR
John W. Gray, Ware, Mass., assignor to Galileo Electro-Optics Corp., Sturbridge, Mass.
Filed May 15, 1989, Ser. No. 351,824
Int. Cl.[5] H01J 43/12
U.S. Cl. 250—281 6 Claims



1. An ion detector comprising:
conversion dynode means,
MCP means having an inlet surface of a first area, and collector means,
said conversion dynode means being positioned center the inlet of said MCP means and having an emitting surface with a projected area in a plane corresponding with a projected area of said inlet surface that is less than said first area, said conversion dynode means receiving charged particles on and directly emitting charged particles from said emitting surface, and
said collector means being positioned near the outlet of said MCP means,
whereby ions are converted at said emitting surface of said conversion dynode means and the charged particles emitted therefrom are received by and amplified in said MCP means and collected in said collector means.

4,988,869
METHOD AND APPARATUS FOR ELECTRON-INDUCED DISSOCIATION OF MOLECULAR SPECIES
William Aberth, Palo Alto, Calif., assignor to The Regents of the University of California, Oakland, Calif.
Filed Aug. 21, 1989, Ser. No. 396,888
Int. Cl.[5] H01J 49/26
U.S. Cl. 250—281 39 Claims

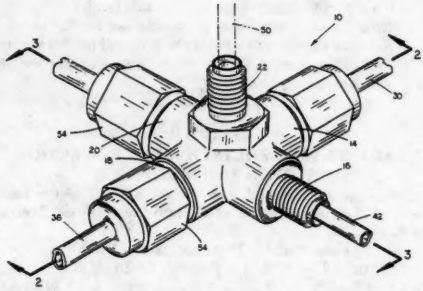


9. A mass spectrometer comprising:
means for generating a primary ion beam from a material sample;
first mass analyzing means for selecting a beam of parent ions from the primary ion beam;
an arcuate anode having a substantially fixed radius relative to a preselected axis said anode being permeable to the passage of electrons and being disposed to receive at least a portion of the beam of parent ions along said preselected axis;
an arcuate cathode disposed concentrically about the anode;
means for heating the cathode to generate electrons;
means for applying a potential difference across the anode and cathode to focus the electrons from the cathode along said preselected axis, whereby collision of the parent ions with said focused electrons dissociates the parent ions into smaller daughter ions;
second mass analyzing means for selecting a mass fraction of the beam of daughter ions; and
means for detecting the selected mass fraction of the daughter ions.

4,988,870
OPEN-SPLIT INTERFACE FOR MASS SPECTROMETERS
John W. Diehl, Grand Forks, N. Dak., assignor to Und-Sem Foundation, Grand Forks, N. Dak.
Filed Oct. 10, 1989, Ser. No. 418,675
Int. Cl.[5] H01J 44/00
U.S. Cl. 250—288 10 Claims

1. An open-end interface for mass spectrometers, comprising:
a connector body having first, second, third and fourth leg members, said first and third legs being generally coaxial and said second and fourth legs being generally coaxial;
a first tubular aperture extending through said connector body and said first and third legs;
a second tubular aperture extending through said connector body and said second and fourth legs, connected with said first tubular aperture at a juncture within said connector body;

a fifth leg projecting from said connector body;
a third tubular aperture extending through said fifth leg to said juncture;
means for sealably connecting a capillary gas chromatograph to said third leg;
a first capillary column end extending from a gas chromatograph, connected to said third leg and extending through said first tubular aperture to said juncture;
a flow restrictor tube extending from a mass spectrometer and



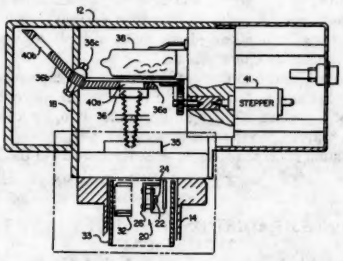
journaled through said first tubular aperture in said first and third legs, said flow restrictor projecting beyond said third leg within said first capillary column end, said first capillary column having an interior diameter larger than said flow restrictor outside diameter, to form an annular gap therebetween;
means for sealably connecting atmospheric pressure-type detectors to said second and fourth legs; and
means for sealably connecting a sweep gas tube to said fifth leg.

4,988,871

GAS PARTIAL PRESSURE SENSOR FOR VACUUM CHAMBER

Carl A. Gogol, Manlius, N.Y., assignor to Leybold Inficon, Inc., E. Syracuse, N.Y.

Filed May 8, 1989, Ser. No. 348,955
Int. Cl.[5] H01J *27/00*
U.S. Cl. 250—306 **11 Claims**



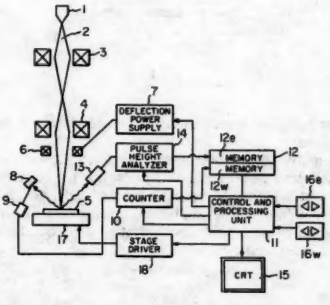
1. A sensor for measuring the relative amount of a specific gas within a vacuum chamber, comprising:
electron beam generating means providing, in a given direction, an electron beam having sufficient energy to excite within an interaction volume, the atoms and molecules of said gas whereby said atoms and molecules emit photons characteristic of said gas,
means in communication with said chamber for conducting said gas to said electron beam,
photodetector means for viewing photons emitted by said atoms and molecules, the photodetector means having a predetermined viewing direction from which said photons are received, and including discriminating means for selecting the photons of said wavelength and excluding others, and means for detecting the intensity of the photons of said selected wavelength and converting said intensity to a proportional electric signal; and
a thermal isolation barrier of a low thermal conductivity, low thermal inertia material surrounding said electron beam generating means and interaction volume to facilitate rapid thermal stabilization of the surroundings of the interaction volume.

4,988,872

ELECTRON PROBE MICROANALYZER HAVING WAVELENGTH-DISPERSIVE X-RAY SPECTROMETER AND ENERGY-DISPERSIVE X-RAY SPECTROMETER

Yoshitaka Nagatsuka; Masayuki Ohtsuki; Masaki Saito; Koji Yoshida, and Kazuyasu Kawabe, all of Tokyo, Japan, assignors to JEOL Ltd., Tokyo, Japan

Filed Jul. 27, 1989, Ser. No. 386,416
Claims priority, application Japan, Jul. 28, 1988, 63-189193
Int. Cl.[5] G01N *23/04*
U.S. Cl. 250—310 **6 Claims**



1. An electron probe microanalyzer comprising:
a means for irradiating the surface of a specimen with an electron beam;
a wavelength-dispersive x-ray spectrometer and an energy-dispersive x-ray spectrometer which detect x-rays emanating from the specimen by the irradiation;
display means on which first and second spectrum being two kinds of spectra created from the x-rays emitted from the same sample region under investigation and detected by the spectrometers are displayed;
means for superimposing a first and a second cursor on the first and second spectrum respectively displayed on the display means to indicate the positions of the energies or wavelengths of characteristic xrays;
a means for manually moving the position of the first cursor; and
a means for automatically moving the second cursor in relation to the position indicated by the first cursor such that the energy indicated by one of the cursors corresponds to the wavelength indicated by the other.

4,988,873

APPARATUS AND METHOD FOR SCANNING TRANSPARENT PHOSPHORS

Anthony R. Lubinsky, Webster, and Robert W. Kulpinski, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 29, 1989, Ser. No. 414,546
Int. Cl.[5] G03B *42/00*
U.S. Cl. 250—327.2 **7 Claims**

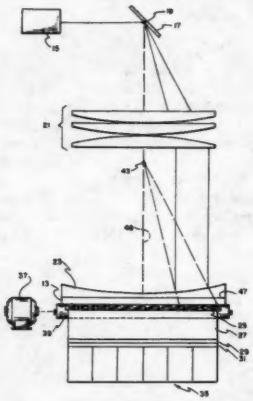
1. Apparatus for scan-stimulating an optically transparent image-storing phosphor to stimulate luminescence from those

portions of the phosphor previously exposed to x-rays emanating from an x-ray source located a predetermined distance from said phosphor, said apparatus including

(a) means for producing a beam of stimulating radiation;

(b) means for scanning said beam along a linear scan path;

(c) a telecentric lens system positioned in said scan path for directing said beam toward said phosphor so that said beam would impinge said phosphor at all points along a



linear scan line from a direction perpendicular to said scan line; and

(d) a negative optical element positioned between said telecentric lens system and said phosphor for controlling the angle at which said beam impinges said phosphor along said scan line so that said beam appears to said phosphor to emanate from a point located at said predetermined distance from said phosphor.

4,988,874

RECORDING MEDIUM MAGAZINE FOR ELECTRON MICROSCOPES

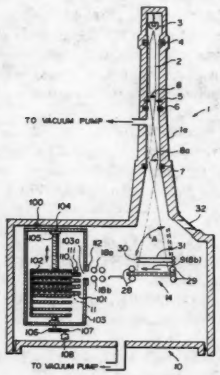
Katsuaki Muraishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 14, 1989, Ser. No. 407,071

Claims priority, application Japan, Sep. 14, 1988, 63-230599

Int. Cl.[5] G03B *42/00*

U.S. Cl. 250—327.2 **7 Claims**



1. A recording medium magazine for an electron microscope, which magazine feeds recording media to a recording position at which a recording medium is exposed to an electron beam which has passed through a sample in an electron microscope,

the recording medium magazine comprising:

(i) a holder accommodating means for holding a plurality of holders which are permeable to an electron beam and each of which houses a single stimulable phosphor sheet serving as the recording medium so that the stimulable phosphor sheet can be taken out,

(ii) a holder feed-in and feed-out means which feeds the holders into and out of said holder accommodating means, and

(iii) a movement means for moving said holder accommodating means with respect to said holder feed-in and feed-out means until a holder held in said holder accommodating means is associated with said holder feed-in and feed-out means.

4,988,875

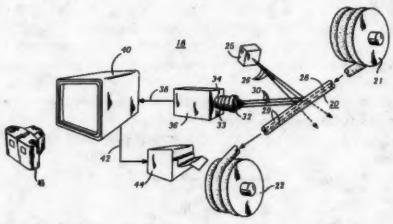
NEAR INFRARED POLYETHYLENE INSPECTION SYSTEM AND METHOD

Marcos G. Ortiz, Freehold, and Marsha S. Stix, Tinton Falls, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 13, 1988, Ser. No. 283,650

Int. Cl.[5] G01N *21/00, 21/01, 21/88, 21/89*

U.S. Cl. 250—330 **10 Claims**



1. An inspection system for inspecting articles comprising polyethylene for possible defects, including voids, which comprises

a source of a beam of electro-optical radiation within a near infrared wavelength range between 800 nm and 2400 nm,

a camera responsive to the electro-optical radiation with wavelengths in said wavelength range for collecting data relating to the article and possible included defects, the camera being capable of operating on said certain wavelengths at which said plastic material has a high spectral transmissivity characteristic,

said source and said camera are positioned each relative to another and to the article so that the camera receives at least a portion of the light beam radiation, directed from the source onto the said article, as

a radiation reflected from at least the defects in the article.

4,988,876

PERSONNEL RADIATION DOSIMETRY DEVICE AND TESTING UNIT

Kevin Doughty, Caernafon Gwynedd, United Kingdom, assignor to Radon Testing Corporation of America, Elmsford, N.Y.

Filed May 25, 1989, Ser. No. 357,706

Int. Cl.[5] G01T *1/14*

U.S. Cl. 250—336.1 **26 Claims**

1. A system for measuring the cumulative amount of radiation received, comprising

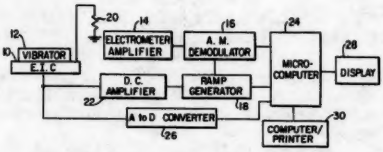
a radiation monitoring means, including an electret supported on a first conductive plate and having a second conductive plate spaced from the electret on the side opposite the first plate, the electret being chargeable to a certain potential and the potential being discharged in

relation to the cumulative amount of radiation received by the electret;

vibrator means for creating a mechanical vibration between the second plate and the electret at a certain rate;

detector means for indicating the alternating electrical field created by the vibration of the second plate;

means for applying to the first conductive plate a D.C. voltage of the opposite polarity to the charge on the electret; and



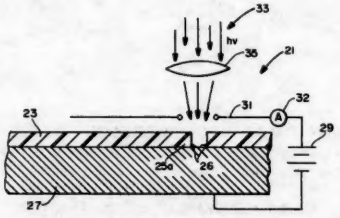
means for increasing the D.C. voltage in a controlled manner until the detector means indicates that the alternating electrical field has been substantially cancelled, whereby the difference between the certain potential of the electret and the D.C. voltage when the field is substantially cancelled is related to the cumulative amount of radiation received.

4,988,877

VIA HOLE CHECKER

Stanley Stokowksi, Danville; David Wolze, San Jose, and Armand P. Neukermans, Palo Alto, all of Calif., assignors to Tencor Instruments, Mountain View, Calif.

Filed Oct. 3, 1989, Ser. No. 416,764
Int. Cl.[5] G01F *23/00*
U.S. Cl. 250—358.1 **21 Claims**



1. A method for determining the cleanliness of the bottom of an aperture formed in a layer of dielectric material, the method comprising the steps of:

providing a layer of electrically conducting material adjacent to a bottom surface of the dielectric layer, where this conducting material is characterized by an electron work function W, said aperture extending downward through said dielectric layer to said layer of conducting material;

illuminating the aperture and surrounding area from above said dielectric layer with light having a wavelength component that stimulates photoemission in the underlying conducting material, thereby causing photoelectrons to be liberated from the layer of conducting material that lies beneath the aperture and nearby surrounding dielectric layer, a portion of the photoelectrons passing through any dielectric material lying at the bottom of the aperture to produce a photoelectron current, photoelectrons liberated beneath said dielectric layer being scattered by said dielectric layer and contributing little to said photoelectron current; and

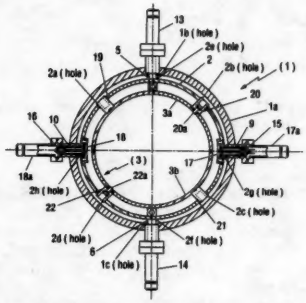
determining the photoelectron current that emerges from the aperture, whereby the cleanliness of the bottom of the aperture is determined.

4,988,878

SUPPORT MEANS FOR A PARTICLE BEAM POSITION MONITOR

William H. VanZwienen, Bayshore, N.Y., assignor to Associated Universities, Inc., Washington, D.C.

Filed Mar. 7, 1990, Ser. No. 489,546
Int. Cl.[5] G01K *5/00*
U.S. Cl. 250—397 **6 Claims**



6. A particle beam apparatus having a beam position monitor apparatus support means that permits relative radial and longitudinal thermal expansive movement between selected concentrically positioned components of the beam apparatus while maintaining the concentricity between those components relative to one another, comprising,

a. a generally cylindrical housing,

b. an annular thermally expandable member positioned concentrically within the housing,

c. a split-plate detector comprising generally symmetrical halves that are positioned concentrically within said housing and within said annular member,

d. and a support means comprising a plurality of dielectric pins each of which has one of its ends secured in sliding relationship against longitudinal movement parallel to the longitudinal axis of said housing, and each of which further extends through aligned apertures in both the annular member and the split plate detector such that the pins form a snug sliding relationship with the sides of said apertures, whereby the housing, the annular member and the split plate detector are permitted to expand and contract radially and longitudinally with respect to one another when the beam apparatus is thermally cycled, while maintaining a predetermined degree of concentricity between them due to their respective interaction with the dielectric pins.

4,988,879

APPARATUS AND METHOD FOR LASER DESORPTION OF MOLECULES FOR QUANTITATION

Richard N. Zare, Stanford, Calif.; Friedrich Engelke, Bielefeld, Fed. Rep. of Germany, and Jong H. Hahn, Stanford, Calif., assignors to The Board of Trustees of the Leland Stanford Junior College, Stanford, Calif.

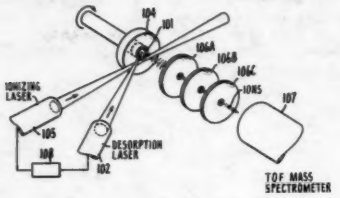
Filed Feb. 24, 1987, Ser. No. 18,875
Int. Cl.[5] H01J *27/24, 46/26*
U.S. Cl. 250—423 P **48 Claims**

1. A method for generating a quantitatable burst of volatilized molecules of a nonvolatile solid organic material comprising the steps of

a. providing the solid organic material as a physisorbed deposit upon a nonporous, inorganic oxide, solid support surface, and

b. striking a controlled area of the deposit with a laser pulse adequate to essentially completely desorb off of the support surface that portion of the deposit struck by the laser pulse, with the laser pulse and the nature of the support

surface being selected and related to provide a rate of heating of the support surface struck by the laser pulse of



at least 10^6° K/sec without volatilization, decomposition or ionization of the support.

4,988,880

X-RAY INTENSIFYING SCREEN CONTAINING HAFNIA PHOSPHOR

Philip S. Bryan, Webster; Patrick M. Lambert, Rochester; Christine M. Towers, Rochester, and Gregory S. Jarrold, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 3, 1989, Ser. No. 305,222

Int. Cl.[5] C09K *11/67*

U.S. Cl. 250—483.1 21 Claims

1. An X-ray intensifying screen comprised of

a support and

a fluorescent layer containing an organic binder that is transparent to X-radiation and to radiation emitted when the layer is excited by X-radiation and a phosphor capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation comprised of monoclinic crystals of a hafnium dioxide phosphor host consisting essentially of oxygen and combined elements satisfying the relationship

$$Hf_{1-z}Zr_z$$

wherein z is in the range of from 4×10^{-4} to 0.3, said phosphor exhibiting a higher luminescence intensity when excited by X-radiation as compared to the phosphor as described above differing solely in that z is less than 4×10^{-4}.

4,988,881

TIN-ACTIVATED LITHIUM HAFNATE PHOSPHOR COMPOSITION AND X-RAY INTENSIFYING SCREEN

Philip S. Bryan, Webster; Patrick M. Lambert, Rochester; Christine M. Towers, Rochester, and Gregory S. Jarrold, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 305,310, Feb. 3, 1989, abandoned. This application Aug. 14, 1989, Ser. No. 393,602

Int. Cl.[5] C09K *11/67*

U.S. Cl. 250—483.1 27 Claims

1. An X-ray intensifying screen comprised of

a support and

a fluorescent layer containing an organic binder that is transparent to X-radiation and to radiation emitted when the layer is excited by X-radiation and phosphor crystals capable of absorbing X-radiation and emitting longer wavelength electromagnetic radiation,

characterized in that the phosphor crystals consist essentially of oxygen and a combination of metals satisfying the relationship:

$$Li_2Hf_{1-x-y-z}Zr_zSn_yTi_xL_w$$

where

L is at least one rare earth selected from the group consisting of praseodymium, samarium, europium, gadolinium, terbium, dysprosium, and ytterbium;

y is in the range of from from 1×10^{-3} to 0.2:

w+x+y are together up to 0.2; and

z is up to 0.2;

said phosphor crystals exhibiting a higher luminescence intensity when excited by X-radiation as compared to the phosphor crystals as described above absent tin.

4,988,882

MONOCRYSTALS OF SILICATES OF LANTHANIDES USABLE AS SCINTILLATORS FOR THE DETECTION OF X AND GAMMA RADIATION

Bernard Francois, Voreppe; Monique Navizet, Proveyzieux; Jean-Claude Rebreyend, Villard de Lans, and Christophe Wyon, Saint Egreve, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 21, 1989, Ser. No. 369,110

Claims priority, application France, Jul. 6, 1988, 88 09152

Int. Cl.[5] G01T *1/202*

U.S. Cl. 250—483.1 9 Claims

1. An X and/or gamma ray detector comprising a lanthanide silicate monocrystal scintillator and a photodetector for detecting the light coming from the scintillator, characterized in that the monocrystal scintillator has an apatite structure and complies with the formula:

$$Ln_{1-x-x_2-x_3}Ln'_{x_1}Ce_{x_2}Tb_{x_3})_{9.33}(SiO_4)_6O_2$$

in which Ln and Ln', which differ, represent a rare earth element chosen from among La, Gd, Yb and Lu and x_1, x_2 and x_3 are such that

$$0\leqq x_1<1$$

$$0<x_2\leqq0.05$$

$$0\leqq x_3\leqq0.05$$

$$0<x_2+x_3\leqq0.1$$

$$0<x_1+x_2+x_3<1$$

4,988,883

FINGERNAIL PHOTOPOLYMERIZATION APPARATUS

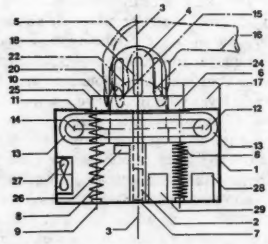
Steffen Oppawsky, Bad Homburg, Fed. Rep. of Germany, assignor to Heraeus Kulzer GmbH, Hanau am Main, Fed. Rep. of Germany

Filed Jul. 12, 1989, Ser. No. 378,633

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1988, 3825324

Int. Cl.[5] G21K *5/08*

U.S. Cl. 250—492.1 17 Claims



1. A fingernail light system for curing photo-polymerizable plastics on fingernails, having

a housing (1) with a bottom plate (7) in which housing there is provided a support body (4), having indentations (18) on its outer contour, for positioning fingers (20–24) of a hand to be irradiated, and having at least one irradiation lamp

(14), which at least partially surrounds the support body in a spaced-apart manner in an irradiation position, the support body being accessible in the irradiation position via an opening (10) formed in the housing (1),

and wherein,

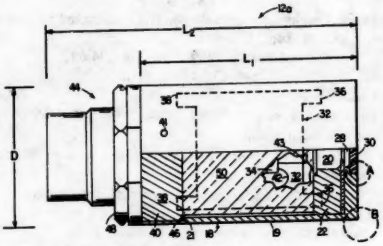
the support body (4) has a generally convex outer contour, defining a central palm-support surface with said indentations radiating therefrom, said indentations defining channels (18) that extend substantially in the direction of a longitudinal axis (3) of the support body (4), and positively position fingers placed therein, and the axis (3) of the support body (4) forms an angle (30) in the range from 0° to 90° with the direction (31) orthogonal to the bottom plate (7).

4,988,884

HIGH TEMPERATURE RESISTANT FLAME DETECTOR

Robert A. Dunbar, Swampscott, and John M. McClelland, South Weymouth, both of Mass., assignors to Walter Kidde Aerospace, Inc., Wilson, N.C.

Filed Nov. 22, 1988, Ser. No. 275,119
Int. Cl.[5] G08B *17/12*
U.S. Cl. 250—554 42 Claims



1. A flame detector comprising

a single-wall housing containing a flame sensor and circuitry for processing signals produced by said sensor, said housing having a predetermined outer diameter, and

a thin, highly thermally reflective coating adhered to an outer surface of said housing for shielding said sensor and said circuitry from high ambient temperatures,

whereby said detector is operable at said high ambient temperatures while having an outer diameter that is substantially the same as said predetermined diameter,

said detector further comprising a thermally insulating material disposed within said housing and surrounding said circuitry and substantially filling all voids between said housing and circuitry to further protect said circuitry from said high ambient temperatures.

4,988,885

REMOTE OPTICAL WAVE MEASUREMENT SENSOR

Carl E. Lindstrom, N. Stonington, Conn., assignor to The United States of America as Represented by the Secretary of the Navy, Washington, D.C.

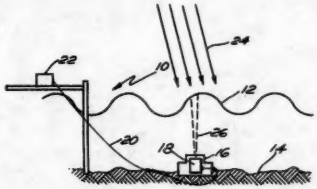
Filed Feb. 6, 1990, Ser. No. 475,562
Int. Cl.[5] G01N *15/06;* G01W *1/00*
U.S. Cl. 250—560 11 Claims

1. An apparatus for remotely measuring ocean surface wave characteristics, comprising:

a light source, positioned above said ocean surface, for illuminating said ocean surface with radiant light;

sensing device means, being mounted on a platform under the surface of said ocean, for receiving a small preselected angle θ, narrow-field-of-view, portion of said radiant light that has traversed through said ocean to said sensing device means from the surface thereof, said radiant light having been modulated in direct proportion to said surface wave characteristics, said sensing device means then converting said modulated narrow-field-of-view light signals to corresponding proportional analog electrical data output signals;

a transmission cable, having first and second ends, said first cable end being electrically connected to said sensing device means, for providing a DC power path to said sensing device means and receiving said proportional analog electrical data output signals therefrom;



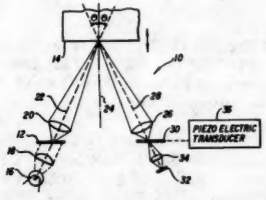
DC power supply means, electrically connected to said second cable end, for providing DC power to said sensing device means through said transmission cable; and p1 data acquisition means, electrically connected to said second cable end and disposed at a location remote from said submerged sensing means, for receiving, processing and storing said proportional analog electrical data output signals from said sensing device means, said processed electrical signal containing said desired ocean surface wave characteristics.

4,988,886

MOIRE DISTANCE MEASUREMENT METHOD AND APPARATUS

Russell J. Palum, Pittsford, and John E. Greivenkamp, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 6, 1989, Ser. No. 334,421
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—561 10 Claims



1. Moire distance measurement apparatus, comprising;

a. means including a light source, a grating, a condenser lens between the light source and the grating, and a projection lens after the grating for projecting an image of the grating onto a diffusely reflecting surface;

b. means including a viewing lens for forming an image of said projected image on a second grating to generate a Moire pattern; and

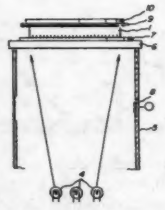
c. means for sensing a temporal change in said Moire pattern as the surface is moved to determine the distance that the surface is moved.

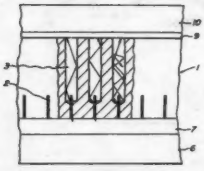
4,988,887

METHOD OF INSPECTING DIE FOR FORMING HONEYCOMB STRUCTURE

Mitsuaki Watanabe, Inazawa, and Masayoshi Nakane, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Aichi, Japan

Filed Mar. 1, 1990, Ser. No. 486,921
Claims priority, application Japan, Mar. 1, 1989, 1-49598
Int. Cl.[5] G01N *21/88*
U.S. Cl. 250—572 5 Claims





1. A method of inspecting a die having slits of narrow widths and a number of rear apertures communicating with the slits for forming honeycomb structures, said method comprising steps of irradiating diffused light beams onto an end face of the die on a side of the slits, detecting intensities of light beams arrived at an end face of the die on a side of the rear apertures by irregularly reflecting at inner surfaces of the rear apertures by means of photosensitive means arranged at the end face of the die on the side of the rear apertures, and determining roughness distributions of the inner surfaces of the number of rear apertures with the aid of bright and dark portions on the photosensitive means.

4,988,888

CMOS OUTPUT CIRCUIT WITH INTERMEDIATE POTENTIAL SETTING MEANS

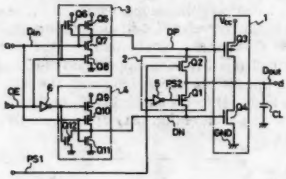
Toshihiko Hirose, and Tomohisa Wada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 113,308, Oct. 28, 1987, abandoned.
This application Jun. 5, 1989, Ser. No. 361,725
Claims priority, application Japan, Oct. 28, 1986, 61-257364
Int. Cl.[5] H03K *17/16, 19/024, 3/01*
U.S. Cl. 307—443 7 Claims

1. A semiconductor integrated circuit device comprising:

an output MOSFET circuit having a pair of MOSFETs which include respective gate electrodes and an output terminal at a junction between said pair of MOSFETs, the pair of MOSFETs being controlled by first and second output control signals, respectively, to provide a logical signal at said output terminal of one of two potentials; and

an intermediate potential setting circuit connected between said gate electrodes of said pair of MOSFETs and having an output connected to said output terminal of said output MOSFET circuit and controlled by third and fourth different output control signals applied at a predetermined time prior to a variation of said logical signal at said output terminal by said output MOSFET circuit, said third and fourth output control signals being different from said first



and second output control signals, for setting said output terminal at an intermediate potential between said two potentials in accordance with said third and fourth output control signals.

4,988,889

POWER SOURCE FOR EMERGENCY LIGHTING SYSTEMS

George W. Oughton, Jr., Raleigh, N.C., assignor to Self-Powered Lighting, Inc., Elmsford, N.Y.

Filed Jul. 3, 1989, Ser. No. 374,697
Int. Cl.[5] H02J *9/06*
U.S. Cl. 307—66 7 Claims

1. In a power source for a battery operated system, the combination comprising:

dc power source means for providing a battery-simulating voltage

a high frequency dc-to-dc input converter means for supplying power to said dc power source means;

a substantially constant current demand load;

second converter means for repetitively transferring current from said dc power source means to said load and including an inductor means and a capacitor parallely connected to said load and a diode electrically connecting said inductor and said capacitor, switching means for alternately storing and releasing current from said inductor means to said load and connected in series with said inductor; and

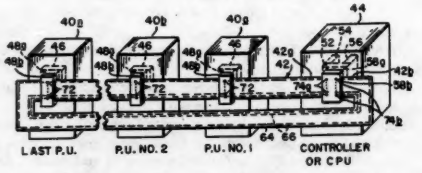
battery means in parallel with said dc power source means for maintaining the voltage on said dc power source means and operating said second converter means in the absence of power by said input converter means.

4,988,890

SIGNAL TRANSMISSION AND RECEIVING SYSTEM WITH LOOPED TRANSMISSION LINE

Larry Narhi, Bolton, and Thomas Pitman, Sterling, both of Mass., assignors to Digital Equipment Corp., Maynard, Mass.

Filed Jun. 20, 1989, Ser. No. 368,786
Int. Cl.[5] H01R *9/07*
U.S. Cl. 307—147 12 Claims



1. Signal transmission and receiving apparatus comprising a transmission line including a plurality of insulated conductors;

connector means, said connector means including two sets of contact elements;

means for electrically connecting contact elements of one set to said conductors at one end of the transmission line;

means for connecting the contact elements of the other set to said conductors at the opposite end of the transmission line; and

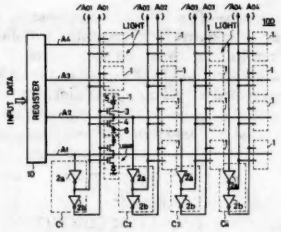
one or more additional connector means mounted to the transmission line intermediate the ends thereof, each of said additional connector means including a set of contact elements selectively connected electrically to said conductors.

4,988,891

SEMICONDUCTOR NEURAL NETWORK INCLUDING PHOTOSENSITIVE COUPLING ELEMENTS

Koichiro Mashiko, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1989, Ser. No. 406,651
Claims priority, application Japan, May 9, 1989, 1-116516
Int. Cl.[5] G06G *7/16*
U.S. Cl. 307—201 **13 Claims**



1. A semiconductor electronic circuit modeled on a vital nerve network, comprising:

a plurality of data input lines to which input data are transmitted respectively;

means provided in correspondence to respective said plurality of data input lines for amplifying potentials on corresponding said data input lines, said amplifying means deriving complementary amplified signals;

a plurality of data output lines arrayed in a direction intersecting with said plurality of data input lines, said plurality of data output lines including a plurality of data output line pairs, said data output line pairs being provided in correspondence to respective said amplifying means and receiving outputs from corresponding said amplifying means; and

a plurality of coupling elements provided at crosspoints of said data input lines and said data output lines for transmitting signals corresponding to potential levels on corresponding said data output lines onto corresponding said data input lines, states of respective said coupling elements being optically settable, said coupling elements coupling corresponding said data output lines to corresponding said data input lines in accordance with set states.

4,988,892

METHOD AND CIRCUIT FOR GENERATING DEPENDENT CLOCK SIGNALS

David L. Needle, Alameda, Calif., assignor to Atari Corporation, Sunnyvale, Calif.

Filed Jun. 2, 1989, Ser. No. 361,020
Int. Cl.[5] H03K *5/13, 19/00*
U.S. Cl. 307—269 **5 Claims**

1. A circuit for generating a dependent clock signal from a master clock signal with a minimal skew of the dependent clock signal - with respect to the master clock signal, which comprises:

a source of the master clock signal,

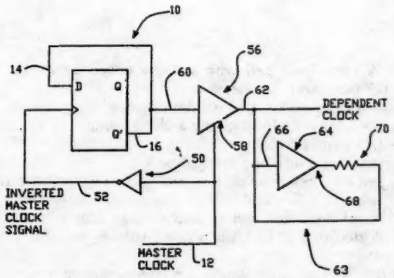
an inverter having an input line and an output line, the input line being connected to said source of the master clock signal,

means for generating a dependent clock signal, having a clocking input line and an output line, the clocking input line being connected to the output of the inverter,

a tri-state driver having an input line, an enable line and an output line, the output line being capable of producing a low voltage state, a high voltage state and a high impedence state, the input line of the tri-state driver being connected to the output line of the means for generating a dependent clock signal and the enable line being connected to the master clock signal, and

a repeater circuit having an input line and an output line, wherein the input line and the output line of the repeater circuit is connected to the output line of the tri-state driver,

wherein said circuit generates a dependent clock signal with minimal skew by driving the means for generating dependent signal with the output of the inverter and enabling the tri-state buffer with the master clock signal; the output line of the means for generating a dependent clock signal being stable by the time the enable line of the tri-state buffer is activated by the master clock signal, thereby reducing the skew between the master clock signal and



the dependent clock signal to the delay of the tri-state driver.

5. A method of generating a dependent clock signal from a master clock signal with minimal skew of the dependent clock signal with respect to the master clock signal, which comprises:

providing a first master clock signal which alternates between a "zero" level and a "one" level,

inverting the first master clock signal to create a second master clock signal that is 180 degrees out of phase with respect to the first master clock signal,

driving a flip flop circuit with the second master clock signal, wherein the flip flop circuit is of the type having an output that can remain in either a "one" state or a "zero" state, the output of the flip flop changing states when the second master clock signal changes from a zero level to a one level,

enabling a tri-state driver, with the first master clock signal, wherein the tri-state driver is of the type having an input coupled the output of the flip flop circuit and an output that can remain in either a low state, a high state or a high impedance state, and

connecting to the output of the tri-state driver a repeater circuit of the type having an input level and an output level such that the output level remains the same as the input level until the input level is changed.

4,988,893

LATCH CELL FAMILY IN CMOS TECHNOLOGY GATE ARRAY

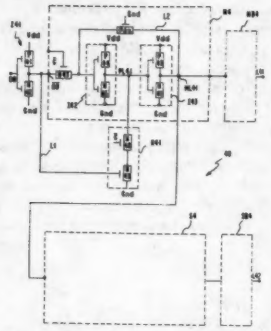
Martine Bonneau, Itteville; Gerard Boudon, Mennecy; Jean-Claude Le Garrec, Longjumeau; Pierre Mollier, Boissise Le Roi, and Frank Wallart, Vert-Saint-Denis, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,806

Claims priority, application European Pat. Off., Dec. 30, 1986, 86430057.9

Int. Cl.[5] H03K *3/26, 19/094, 3/29*

U.S. Cl. 307—279 1 Claim



1. A basic latch cell with a single ended data input in a CMOS gate array, comprising:

a data input node receiving data signals;

a clock input node receiving a clock signal;

a data output node;

first and second voltage supplies;

a pair of cross coupled first and second inverters forming respective first and second stages, each stage being provided with first and second voltage supply nodes connected to said first and second voltage supplies, respectively;

a data storage node which is a common node between the output of the first inverter and the input of the second inverter;

a transmission gate arranged to selectively connect said data storage node to said data input node and controlled by said clock input node, characterized in that the gate includes variable load means connected in a negative feedback loop to form a pull down leg between the data storage node and the data input node of the latch cell, to increase the output impedance of said second stage;

further characterized in that said variable load means are comprised of one device controlled by the clock signal, mounted in series with another device, the gate of said other device being connected to the data input node.

4,988,894

POWER SUPPLY SWITCHING CIRCUIT

Akira Takiba; Hiroyoshi Murata; Yasoji Suzuki, all of Yokohama, and Isao Abe, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 14, 1989, Ser. No. 365,739

Claims priority, application Japan, Jun. 16, 1988, 63-149156

Int. Cl.[5] H03K *3/01, 17/687*

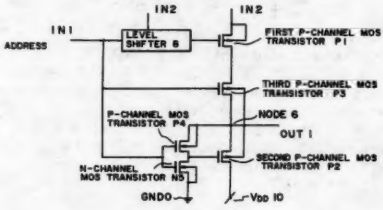
U.S. Cl. 307—296.1 4 Claims

1. A power supply switching circuit comprising:

first, second, and third MOS transistors mutually connected in series such that said third MOS transistor is located between said first and second MOS transistors, wherein an output terminal is formed between said second MOS transistor and said third MOS transistor, and wherein a first potential is supplied to a source of said first MOS transistor and a standard potential is supplied to a drain of said second MOS transistor;

an inverter having a pair of cooperative MOS transistors having sources through which a signal is outputted to a gate of said second MOS transistor in response to an input of said switching circuit; and

a level shifter which outputs a low or high potential to said first MOS transistor in response to said input of said switching circuit;



wherein a source of said third MOS transistor is connected to a drain of said first MOS transistor, a drain of said third MOS transistor is connected to a source of said second MOS transistor, and a back gate of said third MOS transistor is connected to said output terminal, said output terminal located at a connection point of said drain of said third MOS transistor to said source of said second MOS transistor.

4,988,895

COMPARATOR CIRCUIT

Seiichiro Kihara, Nara; Zenpei Tani, Tondabayashi, and Hisao Nagao, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

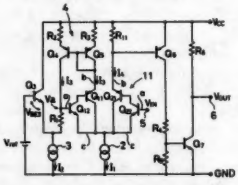
Continuation of Ser. No. 316,985, Feb. 28, 1989, abandoned.

This application Jun. 22, 1990, Ser. No. 541,211

Claims priority, application Japan, Feb. 29, 1988, 63-27109

Int. Cl.[5] H03K *5/153, 5/24, 5/08*

U.S. Cl. 307—359 8 Claims



1. A comparator circuit comprising:

differential amplifier means including

a first complex-connected transistor pair including a first n-p-n transistor with an emitter coupled to a first current source, a base coupled to a comparator reference voltage, and a collector and a first p-n-p transistor with an emitter, a base coupled to the collector of said first n-p-n transistor, and a collector coupled to said first current source, and

a second complex-connected transistor pair including a second n-p-n transistor with an emitter coupled to said first current source, a base coupled to a comparator circuit input, and a collector and a second p-n-p transistor with an emitter, a base coupled to said collector of said second n-p-n transistor, and a collector coupled to said first current source;

current mirror means, coupled to said base of said first n-p-n

transistor, said emitter of said first p-n-p transistor, and to a system power source, for varying said comparator reference voltage so that the comparator circuit has a hysteresis property;

output means, coupled to said emitter of said second p-n-p transistor, said system power source, and system ground, for outputting output pulses as the comparator circuit output; and

a current supply resistor, coupled to said emitter of said second p-n-p transistor, said output means, and said system power source, for preventing the occurrence of noise impulses in the output pulses of the comparator circuit by preventing operation of said output means before a change in said hysteresis property of said differential amplifier means has occurred.

4,988,896

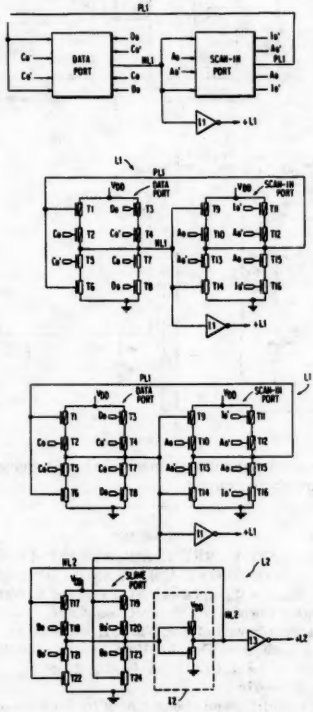
HIGH SPEED CMOS LATCH WITHOUT PASS-GATES

Albert M. Chu, Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 31, 1989, Ser. No. 386,916

Int. Cl.[5] H03K *3/037, 3/356, 19/069, 17/687*

U.S. Cl. 307—452 **11 Claims**



1. A latch circuit, comprising

first and second potential terminals;

first and second MOS transistors of a first type connected in series to form a first pair of transistors;

third and fourth MOS transistors of the first type connected in series to form a second pair of transistors, said first and second pairs of transistors being connected in parallel with each other between the first potential terminal and a first node;

fifth and sixth MOS transistors of a second type which is different from the first type, said fifth and sixth transistors being connected in series to form a third pair of transistors;

seventh and eighth MOS transistors of the second type connected in series to form a fourth pair of transistors, said third and fourth pairs of transistors being connected in parallel between the first node and the second potential terminal;

inverse logic means for receiving a logic voltage at the first node, and for outputting a logic voltage at a second node which is the inverse of the logic voltage at the first node; and

an invertor having its input connected to the first node, and its output representing an output of the latch circuit;

the gates of said first and sixth transistors receiving the inverse of a voltage on the first node, the gates of said third and eighth transistors being connected to receive a first logic signal, the gates of said second and seventh transistors being connected to receive a first clock signal, and the gates of said fourth and fifth transistors being connected to receive a second clock signal having a phase opposite to the phase of the first clock signal.

4,988,897

TTL TO CMOS INPUT BUFFER CIRCUIT

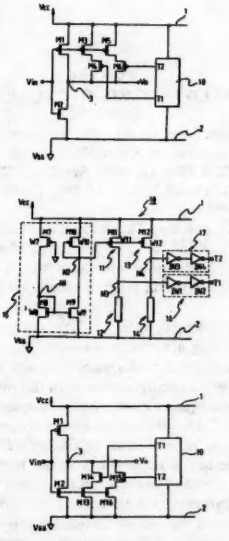
Tae-sung Jeong, Seoul, Rep. of Korea, assignor to Samsung Electronics, Co., Ltd., Suwon, Rep. of Korea

Filed Aug. 21, 1989, Ser. No. 396,477

Claims priority, application Rep. of Korea, May 27, 1989, 89-7106[U]

Int. Cl.[5] H03K *19/092, 19/094, 19/017, 17/284*

U.S. Cl. 307—475 **43 Claims**



1. An input buffer circuit with compensation for device temperature change comprising:

a first MOS transistor, of a first conduction type; a second MOS transistor, of a second conduction type; said first and second MOS transistors are serially connected by their

current electrodes between a first power source and a second power source;

an buffer input signal is applied to the gate of both said first and second MOS transistor, and a CMOS output signal is provided from a point of serial connection between said first and second MOS transistors;

a third MOS transistor, of said first conduction type; said buffer input also being connected to the gate of said third MOS transistor;

a switch switched by a signal indicating whether the device temperature is above or below a predetermined level;

said third MOS transistor has a current electrode connected to said first power source, and another current electrode connected by said switch to the point of connection between said first MOS transistor and said second MOS transistor;

whereby the logic threshold voltage level of the buffer is adjusted to provide temperature compensation.

4,988,898

HIGH SPEED ECL/CML TO TTL TRANSLATOR CIRCUIT

Lars G. Jansson, Long Island, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 15, 1989, Ser. No. 352,169

Int. Cl.[5] H03K *19/013, 19/092, 19/086, 19/088*

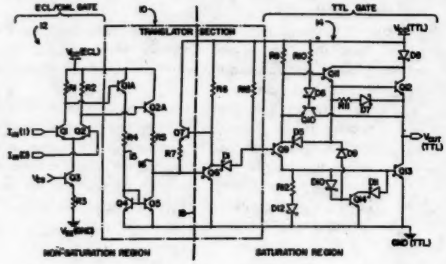
U.S. Cl. 307—475 **24 Claims**

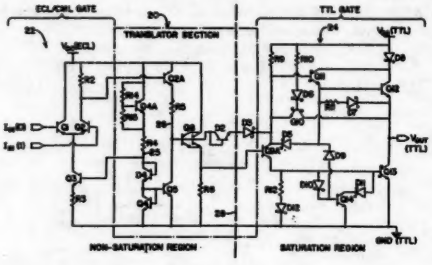
1. An ECL/CML to TTL translator circuit for coupling the output of ECL/CML gate to the input of a TTL gate, said ECL/CML gate operating with reference to a specified reference voltage level and in the non-saturation operating region, comprising:

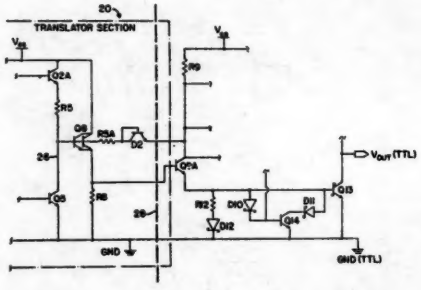
a reference voltage level shifting current mirror circuit means having a non-current switching constant current first branch circuit and a second branch circuit coupled in current mirror configuration with the first branch circuit, said second branch circuit being coupled to the output of the ECL/CML gate and being constructed for shifting the reference voltage level at the ECL/CML gate output and for delivering a reference voltage level shifted output signal at a second branch circuit output node;

and an operating region translating emitter follower output buffer circuit having an emitter follower transistor element coupled in emitter follower configuration with a base node coupled to the second branch circuit output node of the current mirror circuit means to receive the voltage level shifted output signal and drive the input of the TTL gate in the saturation operating region;

said circuit functions of reference voltage level shifting and of operating region translating being thereby separately performed by separate components respectively of said







current mirror circuit means and said emitter follower output buffer circuit.

4,988,899

TTL GATE CURRENT SOURCE CONTROLLED OVERDRIVE AND CLAMP CIRCUIT

Lars G. Jansson, Long Island, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 352,169, May 15, 1989. This application Dec. 11, 1989, Ser. No. 450,826

Int. Cl.[5] H03K *19/092, 19/003*

U.S. Cl. 307—475 **22 Claims**

1. An overdrive and clamp circuit for high speed switching of a TTL switching transistor element comprising:

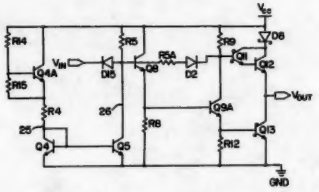
a reference voltage current source;

an emitter follower transistor element having a base node coupled to the reference voltage current source, said emitter follower transistor element being coupled to drive the TTL switching transistor element;

said reference voltage current source having a reference voltage level at the base node of the emitter follower

transistor element for providing base drive to the TTL switching transistor element for accelerated turn on of the TTL switching transistor element;

and a base drive clamp circuit coupled between a collector node of the TTL switching transistor element and a base node of the emitter follower transistor element for clamping operation of the TTL switching transistor element out



of the deep saturation operating region said base drive clamp circuit comprising a resistor element and a PN diode junction element coupled in series, said resistor element in series with the PN diode junction element providing a programmable clamp voltage according to the selected resistance of the resistor element for clamping operation of the TTL transistor element in a desired operating range.

4,988,900

ANALOG SIGNAL WAVEFORM GENERATOR

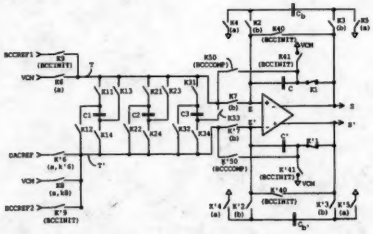
Thierry Fensch, Grenoble, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Dec. 27, 1989, Ser. No. 456,644

Claims priority, application France, Dec. 28, 1988, 88 17577

Int. Cl.[5] H03M *1/66;* H03K *5/22, 17/56*

U.S. Cl. 307—494 **5 Claims**



1. A waveform generator designed to supply an analog signal from a sequence of digital control words, each word representing an increment of the analog signal to be produced, the generator comprising:

a switched-capacitor circuit including a differential amplifier having at least one input and one output,

an integration capacitor coupled between the output and the input,

a feedback switched-capacitor coupled between the output and the input,

several input switched-capacitors with the same nominal capacitance value and connected to be selectively switched between a reference voltage and the input, either individually or in parallel as a function of the digital control word applied,

means for determining which one of the input capacitors has the closest actual capacitance value to the average capacitance value of the input capacitors, and

means for selecting the determined one input capacitor for use during a subsequent formation sequence of an analog signal when the applied control word denotes switching of a single input capacitor between the reference voltage and the amplifier input.

4,988,901

PULSE DETECTING DEVICE FOR DETECTING AND OUTPUTTING A PULSE SIGNAL RELATED TO THE SLOWER FREQUENCY INPUT PULSE

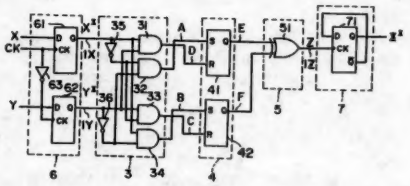
Setsufumi Kamuro; Yoshiaki Shibuya, both of Matsudo, and Hiroyuki Ozu, Ikoma, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 14, 1989, Ser. No. 338,278

Claims priority, application Japan, Apr. 15, 1988, 63-93844; Mar. 29, 1989, 1-77533

Int. Cl.[5] H03K *9/06;* H03L *7/00*

U.S. Cl. 307—518 **13 Claims**



1. A pulse detecting apparatus comprising:

pulse detecting means, receiving first and second input pulse signals, for detecting input conditions of said first and second input signals and providing detected pulse signals indicative thereof;

pulse change detecting means, coupled to said pulse detecting means, for detecting a change in said input conditions of said first and second input signals in accordance with said detected pulse signals and for providing pulse change signals indicative thereof; and

pulse synthesizing means, coupled to said pulse change detecting means, for synthesizing an output pulse of a frequency corresponding to a slower frequency of said first and second input pulse signals in accordance with said pulse change signals.

4,988,902

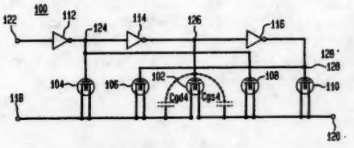
SEMICONDUCTOR TRANSMISSION GATE WITH CAPACITANCE COMPENSATION

Andrew G. F. Dingwall, Bridgewater, N.J., assignor to Harris Corporation, Melbourne, Fla.

Filed May 24, 1989, Ser. No. 356,086

Int. Cl.[5] H03K *17/16*

U.S. Cl. 307—572 **42 Claims**



1. Circuitry comprising:

a first field effect transistor of a first conductivity type and having first and second output terminals and a gate terminal and having a first parasitic capacitance coupled between the gate terminal and the first output terminal and having a second parasitic capacitance coupled between the gate terminal and the second output terminal;

first, second, third and fourth capacitance means each having first and second terminals;

first and second inverters each having an input terminal and an output terminal;

a first circuitry input/output terminal being coupled to the first terminals of the first and second capacitive means and to the first output terminal of the first transistor;

a second circuitry input/output terminal being coupled to the first terminals of the third and fourth capacitive means and to the second output terminal of the first transistor;

the second terminals of the first and third capacitive means being coupled to the input terminal of the first inverter;

the output terminal of the first inverter being coupled to the input terminal of the second inverter and to the gate terminal of the first transistor;

the output terminal of the second inverter being coupled to the second terminals of the second and fourth capacitive means; and

the first and second capacitive means have approximately equal capacitances with the sum of the two being approximately equal to the capacitance of the first parasitic capacitance; and

the third and fourth capacitive means have approximately equal capacitances with the sum of the two being approximately equal to the capacitance of the second parasitic capacitance.

4,988,903

COIL ASSEMBLY FOR VOICE COIL MOTOR

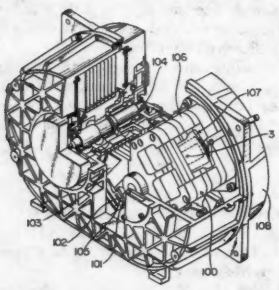
Hiroshi Koriyama, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 14, 1989, Ser. No. 407,446

Claims priority, application Japan, Sep. 16, 1988, 63-231815

Int. Cl.[5] H02K *41/00;* **G11B** *17/08, 5/596, 33/14*

U.S. Cl. 310—12 **2 Claims**



1. A coil assembly for use in a voice coil motor, comprising: a pair of coils; a pair of coil frames made of metallic material and each having a cavity for receiving therein each coil adhered and fixed in the cavity, the pair of coil frames having respective opposed peripheral portions surrounding the cavity and being adhered and fixed to each other to seal the coils; at least one of the coil frames having at its central portion an airhole; and an activated carbon interposed in said cavity.

4,988,904

VOICE COIL MOTOR WITH AN ENCODER

Fumihiro Yaguchi, Maruko, Japan, assignor to Shinano Kenshi Kabushiki Kaisha, Nagano, Japan

Filed Mar. 31, 1989, Ser. No. 331,395

Claims priority, application Japan, Feb. 2, 1989, 1-11522[U]

Int. Cl.[5] H02K *41/00;* **G11B** *21/10*

U.S. Cl. 310—12 **6 Claims**

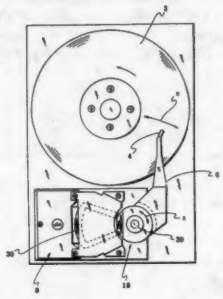
1. A voice coil motor with an encoder comprising:

a base;

permanent magnets substantially fixed on said base;

a rotor rotatably provided on said base, said rotor having an outer fringe area;

a coil formed by winding electric wire around a coil forming section of said rotor, said coil generating magnetic power to rotate said rotor when electric current passes therethrough;



a rotary disk for encoding attached to a disk holder section which is provided at the outer fringe section of said rotor; and

an encoder fixed on said base in a path of said rotary disk.

4,988,905

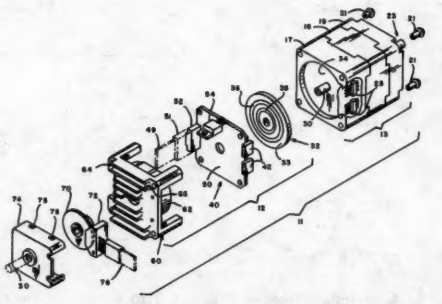
INTEGRATED DRIVER-ENCODER ASSEMBLY FOR BRUSHLESS MOTOR

Robert J. Tolmie, Jr., Brookfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Continuation of Ser. No. 375,565, Jul. 5, 1989, abandoned. This application Jul. 12, 1990, Ser. No. 551,681

Int. Cl.[5] H02K *11/00, 5/00, 5/22*

U.S. Cl. 310—68 B **4 Claims**



4. An improved brushless motor apparatus having a first housing section defining a generally cylindrical chamber enclosed by first and second end walls and having a first rotor section rotatively mounted in said chamber, said chamber having a plurality of formed stator winding wound around respective stators said windings having leads received by a first coupler, wherein the improvement comprises:

said rotor having a second rotor section extending beyond said second end wall;

a actuation disk mounted radially around a portion of said second rotor section and having a commutator ring and a encoder ring magnetized into one face of said actuation disk, said actuation disk be detachably mounted axially to said second rotor section;

a driver board detachably mounted to said second end wall and having fixably mounted a second coupler matingly coupled to said first coupler and having mounted to a first face of said driver board a plurality of commutator sensors aligned axially opposite to said commutator ring and a plurality of encoder sensor aligned axially opposite to said encoder ring;

said driver board having mounted to its second face a third

coupler and a drive circuit in electronic communication with said commutator sensors, said encoder sensors, said second coupler and said third coupler;

a third end wall detachably mounted to said second end wall locating said driver board and actuation disk therebetween and having formed to one face a chamber enclosing said driver circuit of said driver board; and,

a heat sink connected to said driver circuit and fixably mounted to said driver board and detachably mounted to said chamber of said third end wall.

4,988,906

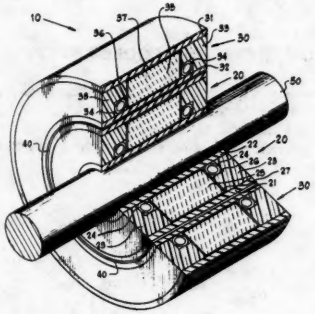
MAGNETIC BEARING ASSEMBLY

David E. Littlefield, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 241,652, Sep. 8, 1988, abandoned. This application Sep. 20, 1989, Ser. No. 410,175

Int. Cl.[5] F16C *39/06*

U.S. Cl. 310—90.5 **10 Claims**



1. A passive magnetic bearing assembly for a rotating shaft comprising:

a. a journal subassembly suitable for mounting to the shaft so as to rotate with the shaft, the journal subassembly comprising a housing forming a chamber containing a journal magnetic material, a flexible fluid-filled hollow member which compensates for changes in the unoccupied volume within the chamber due to thermal expansion and changes in internal pressure, and a damping fluid in the chamber; and

b. a bearing subassembly annularly and concentrically disposed around the journal subassembly such that a clearance is formed between the bearing and journal subassemblies, the bearing subassembly comprising a housing forming a chamber containing a bearing magnetic material, a flexible hollow fluid-filled member which compensates for changes in the unoccupied volume within the chamber due to thermal expansion and changes in internal pressure, and a damping fluid in the chamber.

4,988,907

INDEPENDENT REDUNDANT FORCE MOTOR

James Irwin, Vandalia, Ohio, assignor to Lucas Ledex Inc., Vandalia, Ohio

Filed Jan. 30, 1990, Ser. No. 472,222

Int. Cl.[5] H02K *1/34*; H01F *7/08*

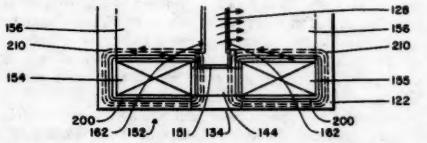
U.S. Cl. 310—181 **25 Claims**

8. A force motor having an axis of operation, said force motor comprising:

a housing, further comprising a stator assembly and four pairs of coil cores;

an armature including a shaft movable in an axial direction, said armature having four sections, a coil core being located on either side of each associated armature section, an end of each coil core and its associated armature section defining a working air gap;

four permanent magnet means for generating a plurality of static magnetic flux paths through said working air gaps, each permanent magnet means, associated with a respective one of said armature sections, generating a magnetic flux path through said working air gaps associated with said one of said armature sections in opposing axial directions;



four coil means, each coil means being associated with a pair of coil cores and associated armature section, wherein each of said coil means further comprises a means for generating at least one electrically excited magnetic flux path, whereby the direction of said electrically excited magnetic flux path is dependent upon the polarity of an electrical current flowing through said associated coil means and is in the same axial direction across the working air gaps for each armature section and its associated coil cores.

4,988,908

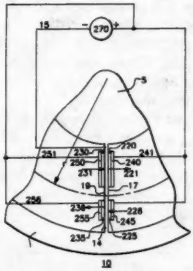
PIEZOELECTRIC TRANSDUCERS FOR A RING LASER GYROSCOPE DITHER MOTOR

Richard G. Langton, Shoreview, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 31, 1989, Ser. No. 359,807

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—331 **2 Claims**



1. A dither motor for a ring laser gyroscope comprising:

a spring comprised of a central member having a central axis passing therethrough, an outer rim centrally positioned about said central axis, and a plurality of flexible radial members connected between said central member and said outer rim, said radial members including first and second surfaces in parallel with said central axis;

each flexible radial member having:

a first piezoelectric element having first and second electrodes on first and second opposite surfaces, respectively, of said first piezoelectric element, and having a polarization of a first polarity defined between said first and second surfaces thereof;

a second piezoelectric element having first and second electrodes on first and second opposite surfaces, respectively, of said second piezoelectric element, and having a polarization of a first polarity defined between said first and second surfaces thereof;

a third piezoelectric element having first and second elec-

trodes on first and second opposite surfaces, respectively, of said third piezoelectric element, and having a polarization of a first polarity defined between said first and second surfaces;

a fourth piezoelectric element having first and second electrodes on first and second opposite surfaces, respectively, of said fourth piezoelectric element, and having a polarization of a first polarity defined between said first and second surfaces;

said first piezoelectric element having its first surface rigidly fixed to said first surface of a first radial member of said plurality of radial members at a portion of said first radial member connected to said central member;

said second piezoelectric element having its second surface rigidly fixed to said second surface of said first radial member at a portion of said first radial member connected to said central member;

said third piezoelectric element having its second surface rigidly fixed to said first surface of said first radial member at a portion of said first radial member connected to said rim;

said fourth piezoelectric element having its first surface rigidly mounted on said second surface of said first radial member at a portion of said first radial member connected to said rim;

said first and third piezoelectric elements being rigidly fixed to said first surface of said first radial member on portions of said radial member opposite the point of inflection about which said rim may be rotated relative to said central member;

said second and fourth piezoelectric elements being rigidly fixed to said second surface of said first radial member on portions of said radial member which are on opposite sides of said point of inflection, and in which said second and fourth piezoelectric elements are positioned opposite said first and third piezoelectric elements, respectively; and

wherein on at least one of said plurality of flexible radial members

at least a selected one of said first, second, third, and fourth piezoelectric elements is adapted to be electrically connected to a detector for detecting a change in the piezoelectric characteristics of said selected one of said piezoelectric elements for providing an indication of the flexure of said first radial member and thereby provide an indication of the rotation of said rim relative to said central member, and

wherein at least a selected pair of said first, second, third, and fourth piezoelectric elements which are on opposite sides of said at least one radial member and in the same proximity relative to said central member are adapted to electrically connected to an electric potential source to effect rotation of said rim relative to said central member.

4,988,909

PIEZOELECTRIC ELEMENT WITH GIANT ELECTROSTRICTIVE EFFECT AND CERAMIC COMPOSITION FOR PREPARING SAME

Atsushi Hagimura, Kamakura, and Mutsuo Nakajima, Tokyo, both of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Jan. 16, 1990, Ser. No. 465,897

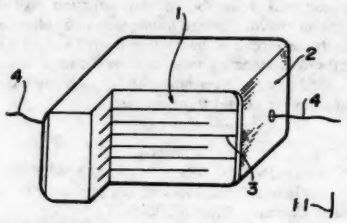
Int. Cl.[5] H01L *41/08;* **C04B** *35/00*

U.S. Cl. 310—358 **9 Claims**

1. A piezoelectric element exhibiting a giant displacement which essentially comprises providing an electrode on both sides of a thin plate or thin film of a ceramic composition represented by the formula:

$$(Pb_xBa_{1-x})_aMe_M(Zr_yTi_{1-y})_cO_d$$

wherein x, y, a, b and c are a value having a range of $0.70<x<0.80$, $0.45\leqq y\leqq 0.65$, $0.85\leqq a\leqq 1.15$, $0.001\leqq b\leqq 0.1$ and $0.85\leqq c\leqq 1.15$, respectively: d is a value determined by the oxidized state of each element: and Me is one or more of metals selected from the group consisting of Ta, Nb, Nd, Y, Th, Bi



and W, and exhibiting an electrostrictive property having a coercive field in the range of from higher than 0 kV/cm to 5 kV/cm or less.

4,988,910

ELECTRON POWER TUBE COOLED BY CIRCULATION OF A FLUID

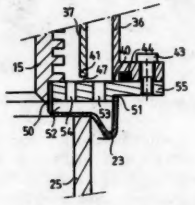
André Gabioud, Thonon Les Bains, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 23, 1989, Ser. No. 314,145

Claims priority, application France, Feb. 26, 1988, 88 02363

Int. Cl.[5] H01J *7/26, 61/52*

U.S. Cl. 313—35 **7 Claims**



1. A power electron tube comprising:

substantially coaxial electrodes including an anode having an interior, hermetically closed space subject to a vacuum, the anode being positioned external to a grid surrounding a cathode;

a substantially circular anode connection part for external electrical connection of the anode, the anode connection part having first and second ends and first and second main faces, the first end of the anode connection part being connected to the anode and a portion of the first main face of the anode connection part being sealed, at a sealing zone, to one end of an insulating tie having another end thereof joined to one of the coaxial electrodes different from the anode, the anode connection part and the insulating tie closing a portion of the interior, hermetically closed space of the anode; and

a cooler providing forced circulation of a cooling fluid and formed by substantially coaxial inner and outer jackets mounted around the anode and defining a closed chamber, the anode connection part being brazed at the second end thereof to a part which is solidly joined to the outer jacket, the anode connection part closing a portion of the closed chamber of the cooler and the cooling fluid circulating along at least a portion of the second main face of the anode connection part adjacent to the insulating tie to cool the sealing zone between the insulating tie and the anode connection part.

4,988,911

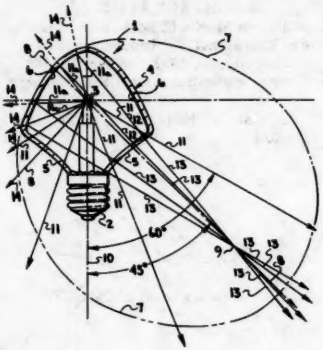
LAMP WITH IMPROVED PHOTOMETRIC DISTRIBUTION

Jack V. Miller, 700 N. Auburn Ave., Sierra Madre, Calif. 91024

Filed Oct. 17, 1988, Ser. No. 270,348

Int. Cl.[5] H01J *5/16*

U.S. Cl. 313—113 12 Claims



1. A lamp comprising:

an envelope having a proximal end and a distal end, said envelope having a central axis passing through said proximal and distal ends;

a base having a central axis coinciding with said central axis of said envelope, said base supporting and electrically connecting a radiant light source to an external power supply, said base having a proximal end and a distal end, said distal end of said base being attached to the proximal end of said envelope; said envelope having a light transmissive window at its proximal end, said window having a proximal end and a distal end, said window being disposed about said central axis and extending away from the distal end said base;

a reflector formed on a surface of said envelope, opposite to said window, and having a proximal end and a distal end, said reflector having its proximal end adjacent to the distal end of said window and disposed about said central axis, reflector being in the form of an internally concave figure of revolution having a focus at said radiant light source and so configured as to direct the light from the source through said window at approximately a 45° angle from the proximal end of the central axis.

4,988,912

ELECTRIC LAMP AND METHOD OF MANUFACTURING SAME

Livio Borgis, S. Antonino, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 9, 1987, Ser. No. 1,737

Claims priority, application Netherlands, Nov. 19, 1986, 8602929

Int. Cl.[5] H01J *5/26, 9/34;* H01K *1/46*

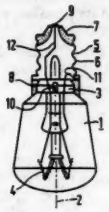
U.S. Cl. 313—318 11 Claims

1. An electric lamp provided with:

a translucent lamp vessel having an axis and an end portion,

a light source in the lamp vessel,

a lamp cap having a sheath portion and a base portion in which said end portion of the lamp vessel is adhesively bound by means of a thermoplastic synthetic resin member which synthetic resin member adheres both to the lamp vessel and to the lamp cap, said lamp cap having an electrical contact to which a current supply conductor to the light source is connected,



characterized in that a polyetherimide is used as the thermoplastic synthetic resin.

4,988,913

FLAT CONFIGURATION CATHODE RAY TUBE

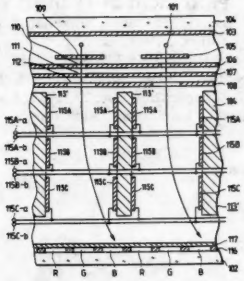
Yoshikazu Kawauchi, Yokohama; Hiroshi Miyama, Yokohama; Kaoru Tomii, Isehara, and Jun Nishida, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Apr. 7, 1989, Ser. No. 334,517

Claims priority, application Japan, Apr. 8, 1988, 63-87484; Apr. 8, 1988, 63-87485

Int. Cl.[5] H01J *29/70*

U.S. Cl. 313—422 10 Claims



1. A flat configuration cathode ray tube comprising:

a plurality of line cathodes for emission of electrons, successively arrayed with a predetermined pitch;

a focus electrode section for focusing respective electron beams which are emitted from the line cathodes;

deflection plates having deflection electrodes for executing deflection of the electron beams after focusing has been executed by the focus electrode section, the deflection electrodes being divided into at least two parts each formed of mutually opposing electrodes; and

an image display section upon which the electron beams are incident display an image;

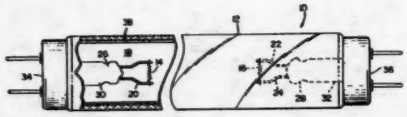
in which the length of a region where deflection is executed by the deflection electrodes, as measured along an electron beam trajectory, is no greater than a value which is substantially equal to three times the pitch of the line cathodes.

4,988,914

RED FLUORESCENT LAMP SUITABLE FOR REPROGRAPHIC APPLICATIONS

Sharon B. Rutfield, No. Chelmsford, and Steven C. Schlitt, Merrimack, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Apr. 24, 1989, Ser. No. 341,878
Int. Cl.[5] H01J *61/38, 61/44*
U.S. Cl. 313—486 9 Claims



1. A fluorescent lamp comprising:

a glass envelope having a substantially circular configuration in cross section and having opposed end portions, said envelope being capable of attenuating radiation having wavelengths below about 500 nanometers;

an electrode located within a respective one of the opposed end portions;

an ionizable medium enclosed within said envelope and including an inert starting gas and a quantity of mercury, said ionizable medium when energized generating a plasma discharge comprising ultraviolet radiation and a limited proportion of visible radiation; and

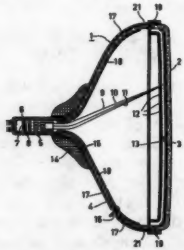
a phosphor means responsive to said ultraviolet radiation generated by said plasma discharge disposed on the inner surface of said envelope and comprising a mixture of a single narrow band emitting phosphor having a peak emission in the wavelength region of from about 590 to 660 nanometers and a predetermined amount of alumina, said amount of alumina by weight being within the range of from about 55 percent to about 95 percent by weight of said phosphor.

4,988,915

PICTURE DISPLAY DEVICE

Antonius P. F. Zegers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 75,775, Sep. 17, 1979, abandoned, which is a continuation of Ser. No. 872,098, Jan. 25, 1978, abandoned. This application Dec. 27, 1985, Ser. No. 815,297
Claims priority, application Netherlands, Feb. 8, 1977, 7701287
Int. Cl.[5] H01J *29/88*
U.S. Cl. 313—479 18 Claims



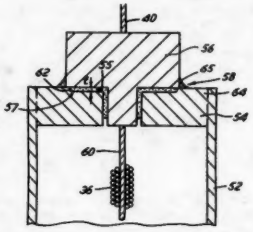
1. An apparatus for displaying pictures comprising a colour display tube including an evacuated envelope having a display window provided with a display screen on its inner surface, a cone and a neck, means mounted in said envelope for generating at least one electron beam directed onto said display screen, and deflection means mounted on said envelope for deflecting said electron beam across said screen, said envelope further including a conductive layer on the internal surface of said cone, a low resistance layer on a portion of the external surface of said cone, and a high resistance layer having a resistance between 10^6 and 10^{10} ohms per square disposed underneath said deflection means on the external surface of said envelope, said high resistance layer being electrically connected to said low resistance layer.

4,988,916

DISCHARGE ARC LAMP

Edwin C. Odell, and Martin G. Scott, both of Oadby, England, assignors to Thorn EMI plc, London, England

Filed Apr. 21, 1989, Ser. No. 341,188
Claims priority, application United Kingdom, Apr. 22, 1988, 8809577
Int. Cl.[5] H01J *17/18, 61/36*
U.S. Cl. 313—623 9 Claims



1. An arc tube for a discharge arc lamp, said arc tube comprising an arc tube body and main electrodes, one a each end of and inside said arc tube body, between which in the operating condition of the lamp a discharge takes place,

said arc tube further comprising at each end thereof an end closure wherein at least one said end closure comprises;

(a) an end plug joined to the respective end, and having a first surface,

(b) a cap-member having a second surface facing said first surface to define a region therebetween.

(c) sealing means adapted to seal said cap member to said end plug comprising sealing material located over at least one part of said region,

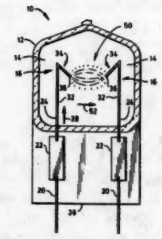
(d) spacing means located at at least one further part of said region, adapted to separate said surfaces at said at least one part by a predetermined and uniform spacing to provide a desired thickness of said sealing material.

4,988,917

HOOKED ELECTRODE FOR ARC LAMP

David A. Cox, Lexington, Ky., assignor to GTE Products Corporation, Danvers, Mass.

Filed Dec. 16, 1988, Ser. No. 285,903
Int. Cl.[5] H01J *61/04*
U.S. Cl. 313—631 28 Claims



1. An electrode for use in an arc discharge lamp with side by side first and second electrodes, at least a first of the electrodes

comprising: a shaft portion projecting in a first direction, leading to a portion hooking back with respect to the first direction on a side adjacent the second electrode and offset from the shaft portion, thereby defining a cross gap between the shaft and the hooking back portion, and a transverse gap between a midpoint of the cross gap and extending perpendicular to the cross gap to the hooking back portion, and including on the hooking back portion an electrode tip positioned for arc discharge in a direction generally transverse to the first direction thereby forming a gap between the shaft portion, and the tip portion in the discharge direction.

4,988,918

SHORT ARC DISCHARGE LAMP

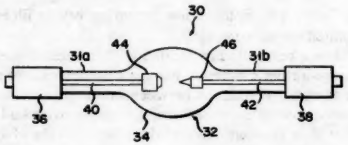
Yasuki Mori, Yokohama; Yasuhiro Iwafuji, Hayama; Yoichiro Mitsuyuki, Tokyo, and Tadatoshi Higashi, Yokohama, all of Japan, assignors to Toshiba Lighting and Technology Corporation, Tokyo, Japan

Filed Jun. 21, 1989, Ser. No. 369,343

Claims priority, application Japan, Jun. 23, 1988, 63-155336; Jun. 23, 1988, 63-155337; Jun. 23, 1988, 63-155339

Int. Cl.[5] H01J *61/20, 61/073*

U.S. Cl. 313—641 **14 Claims**



1. A short arc discharge lamp comprising:

an envelope formed of a vitreous high temperature resistant material;

an anode being sealed at one end of said envelope;

a cathode being sealed at one end of said envelope; and

a charge filling said envelope, said charge comprising at least mercury, rare gas, a halogen having a partial molar quantity of 3.5×10^{-5}-3.5×10^{-3} relative to mercury, and at least one of samarium, gadolinium, praseodymium, lanthanum, yttrium, rhenium, terbium, and europium.

4,988,919

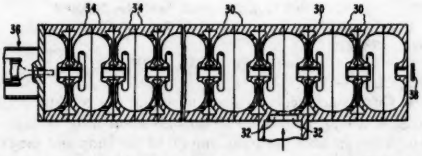
SMALL-DIAMETER STANDING-WAVE LINEAR ACCELERATOR STRUCTURE

Eiji Tanabe, Sunnyvale; Matthew Bayer, Mountain View, both of Calif., and Mark E. Trail, Moscow, Id., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 733,175, May 13, 1985, abandoned. This application Feb. 8, 1988, Ser. No. 157,086

Int. Cl.[5] H05H *9/04*

U.S. Cl. 315—5.410 **30 Claims**



14. A linear accelerator comprising a source of a particle beam having an axis, an accelerating structure for the beam including: plural accelerating cavities having axes substantially coincident with the beam axis, plural webs, each of said webs separating adjacent pairs of said accelerating cavities, each of said webs including a coupling cavity formed substantially, therein between the accelerating cavities adjacent thereto, the coupling cavities being field coupled with the accelerating cavities adjacent thereto and decoupled from the beam except via said adjacent coupling cavities to provide field coupling between the adjacent accelerating cavities, each of said coupling cavities extending at right angles with respect to the beam axis and being configured to have a first region proximate to the beam axis, a second region remote from the beam axis and a center region between the first and second regions and having a length, the first and second regions having lengths in the direction of the beam axis considerably in excess of the length of the center region in the direction of the beam axis.

4,988,920

HIGH-FREQUENCY POWER CIRCUIT FOR GAS DISCHARGE LAMPS

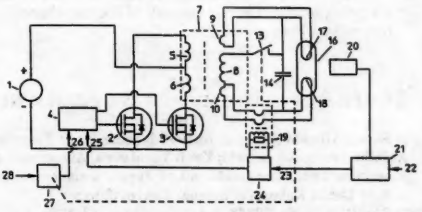
Gerben S. Hoeksma, Winterswijk, Netherlands, assignor to N.V. Nederlandsche Apparatenfabriek Nedap, De Groenlo, Netherlands

Filed Feb. 7, 1989, Ser. No. 306,944

Claims priority, application Netherlands, Feb. 8, 1988, 8800288

Int. Cl.[5] H05B *41/24*

U.S. Cl. 315—101 **17 Claims**



1. A high frequency power circuit for energizing at least one gas discharge lamp with two filaments, said circuit being adapted to be supplied with power from a DC voltage source, said circuit comprising semiconductor switching elements and control means for the semiconductor switching elements, as well as a high frequency transformer having at least one primary winding which, in operation, is supplied with an AC voltage signal by the semiconductor switching elements, and having at least one secondary main winding and secondary auxiliary windings, said secondary auxiliary windings, in operation, energizing the filaments of the at least one gas discharge lamp, characterized in that the control means are adapted to disconnect in a stand-by mode, by at least one controllable switching means, the connection between the at least one secondary main winding and the at least one gas discharge lamp, and, in the stand-by mode, to supply such an AC voltage signal to the at least one primary winding that the filaments of the gas discharge lamp(s) are preheated through the secondary auxiliary windings.

4,988,921

LAMP WITH INTEGRAL AUTOMATIC LIGHT CONTROL CIRCUIT

Elizabeth L. Ratner, Lowell, and David H. Fox, Beverly, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jan. 9, 1989, Ser. No. 295,188

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—159 **7 Claims**

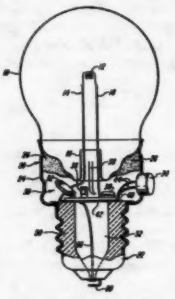
1. A lamp assembly comprising:

a sealed lamp envelope including a lamp stem, said lamp envelope enclosing a filament having electrical leads that extend through said lamp stem;

a lamp base affixed to said lamp envelope adjacent to said lamp stem, said lamp base including a connector for coupling electrical power to said filament and a cup-shaped

portion affixed to said connector and located between said connector and said lamp envelope, said cup-shaped portion including a sidewall; and

an automatic light control circuit located in said lamp base and electrically connected between said connector and



said filament, said light control circuit including a photosensor for controlling the power delivered to said filament in response to a sensed ambient light level, said photosensor being mounted in the sidewall of the cup-shaped portion of said base.

4,988,922

POWER SUPPLY FOR MICROWAVE DISCHARGE LIGHT SOURCE

Isao Shoda; Hitoshi Kodama; Kazuo Magome, all of Kamakura; Akihiko Iwata, Amagasaki; Kenji Yoshizawa, Amagasaki, and Masakazu Taki, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP88/00753, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989, PCT Pub. No. WO89/01234, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 27, 1988, Ser. No. 329,786

Claims priority, application Japan, Jul. 28, 1987, 62-188256

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—223 **12 Claims**

1. A circuit system adapted to supply microwave energy to a microwave discharge light source apparatus including an electrodeless discharge bulb, comprising:

first rectifier means, adapted to be coupled to an AC voltage source of a relatively low voltage and frequency, for outputting a rectified voltage of a relatively low voltage;

filter means, coupled to said first rectifier means, for smoothing said rectified voltage outputted from said first rectifier means, and for outputting a smoothed rectified voltage;

inverter means, coupled to said filter means, for converting said smoothed rectified voltage outputted from said filter means to an AC voltage of a relatively high frequency having a waveform of alternating pulses;

pulse width modulation control means for modulating a pulse width of said pulses of said AC voltage outputted from said inverter means;

a step-up transformer having a primary winding coupled to an output of said inverter means, a secondary winding of the step-up transformer outputting an AC voltage of said relative high frequency and of a relatively high voltage;

second rectifier means, coupled to said secondary winding of said step-up transformer, for rectifying said AC voltage, of the relative high frequency and the relative high voltage outputted from, said secondary winding to a rectified voltage of a relatively high voltage,

a magnetron coupled to said second rectifier means, to be supplied with and operated by said rectified voltage of the relative high voltage outputted from said second rectifier means; and

inductance means, operatively coupled to said step-up transformer, for supressing a rapid change in a level of a current flowing through a winding of said step-up transformer.

4,988,923

LIGHTING EQUIPMENT FOR PROVIDING BRIGHT ILLUMINATION WITH LIMITED SURGE

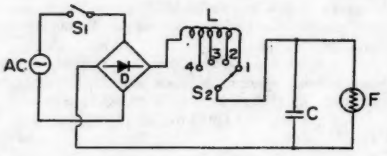
Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

Continuation of Ser. No. 99,528, Sep. 22, 1987. This application Mar. 15, 1989, Ser. No. 323,220

Claims priority, application Japan, Sep. 30, 1986, 61-149814

Int. Cl.[5] H05B *39/04*

U.S. Cl. 315—227 R **13 Claims**



1. A lighting equipment for providing bright illumination with limited surge, comprising:

a capacitor connected in parallel with an incandescent lamp incorporating a filament having a predetermined rating;

an inductance connected between said capacitor and an ac source, said inductance forming together with said capacitor a time constant circuit which controls the charge and discharge of said capacitor so as to limit a surge into said incandescent lamp;

means for rectifying the current from said ac source; and

means for selecting the value of said inductance to supply the rectified current to said filament of said incandescent lamp in order to heat said filament over said predetermined rating;

wherein said filament is protected by the limiting of said surge when dc power is supplied to it from said ac source via said rectifier, the value of a surge decreasing with increase in said selected value of said inductance, said bright illumination during said heating of said filament over said predetermined rating having wavelength components extending from ultraviolet to infrared.

4,988,924

CIRCUIT ARRANGEMENT FOR CONTROLLING THE BRIGHTNESS OF A LAMP

Ingo Maurer, Kaiserstrasse 47, D-8000 Muenchen 40, Fed. Rep. of Germany

PCT No. PCT/EP88/00956, § 371 Date Jun. 6, 1989, § 102(e) Date Jun. 6, 1989, PCT Pub. No. WO89/04110, PCT Pub. Date May 5, 1989

PCT Filed Oct. 25, 1988, Ser. No. 363,888

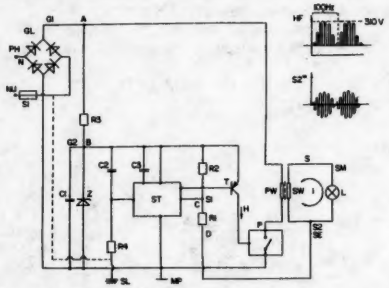
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1987, 3736222

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—291 **6 Claims**

1. Circuit arrangement for controlling the brightness of a lamp in a light connected to a mains alternating voltage, in which circuit both the switching-on of the lamp and the control of the brightness are effected by touching a sensor, and in which there is provided a control unit, to which the sensor is connected and which supplies a brightness signal associated to the brightness of the lamp, characterized in that a rectifier (GL) is provided which is connected to the mains alternating voltage (N), that a transformer circuit (P, S) operating at high-frequency is connected to the rectified mains alternating voltage (G1), the brightness signal (H) being applied to the primary

section (P) of said transformer circuit (P, S) controlled by the control unit (ST), and the lamp (L) which is designed as low



voltage lamp as well as the sensor (SE) being connected to the secondary section (S) of said transformer circuit.

4,988,925

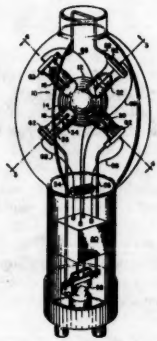
OMNIDIRECTIONAL METAL HALIDE ARC DISCHARGE LAMP

Oscar Biblarz, Carmel, Calif., assignor to GTE Products Corporation, Danvers, Mass.

Filed Dec. 22, 1989, Ser. No. 455,475

Int. Cl.[5] H05B *41/00, 41/14, 41/46*

U.S. Cl. 315—334 **32 Claims**



1. An arc discharge lamp comprising:

an even number of electrodes at least equal to four;

a sealed, light-transmissive discharge vessel including a central portion and electrode mounting portions, one of said electrodes being mounted in each of said electrode mounting portions, said electrodes having a substantially uniform three-dimensional distribution with respect to said central portion; and

a fill material in said discharge vessel for supporting an arc discharge when electrical energy is coupled to said electrodes.

4,988,926

COLOR CATHODE RAY TUBE SYSTEM WITH REDUCED SPOT GROWTH

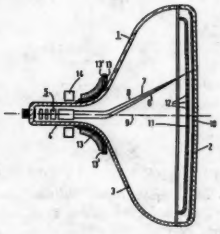
Albertus A. S. Sluyterman, and Marinus L. A. Vrinten, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 16, 1990, Ser. No. 465,691

Claims priority, application Netherlands, Feb. 8, 1989, 8900306; Oct. 12, 1989, 8902529

Int. Cl.[5] H01J *29/70, 29/76*

U.S. Cl. 315—368 **9 Claims**



1. A color cathode ray tube system comprising

(a) an evacuated envelope having a neck, a cone and a display window,

(b) an electron gun in the neck, which gun has a beam-forming part for generating a central electron beam and two outer electron beams whose axes are co-planar, and a first and a second electrode system which in operation jointly constitute a main lens and are connectable to means for supplying an energizing voltage,

(c) an astigmatic element in the electron gun for astigmatically influencing the electron beams, and

(d) a deflection unit for generating line and field deflection fields for deflecting the electron beams, characterized in that an element causing underconvergence is arranged between the beam-forming part of the electron gun and the deflection unit, which element exerts a force on each outer electron beam having a component in the plane of the electron beams transversely to the axis of the relevant outer electron beam and remote from the central electron beam, said force deflecting the outer electron beams away from the central electron beam to cause said underconvergence, and in that the deflection unit is constructed in such a way that it generates deflection fields causing an overconvergence which compensates said underconvergence.

4,988,927

DEFLECTION CIRCUIT FOR A TELEVISION PICTURE TUBE

Manfred Spruck, Villingen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,374

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1988, 3831239

Int. Cl.[5] H01J *29/56*

U.S. Cl. 315—371 **22 Claims**

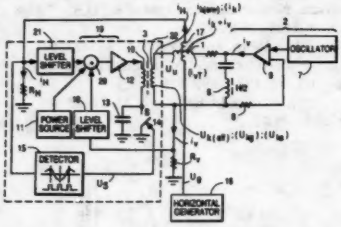
1. A deflection circuit for a television picture tube, comprising:

a horizontal generator producing as a first output a horizontal deflection current for bidirectional scanning;

a vertical generator producing as a second output a vertical deflection current;

means for developing a corrective current in synchronism with said horizontal deflection current; and,

a vertical sweeping coil controlled by said second output current and said corrective current, said corrective current providing predetermined spacing between adjacent horizontal scan lines.



4,988,928

PICTURE DISPLAY DEVICE

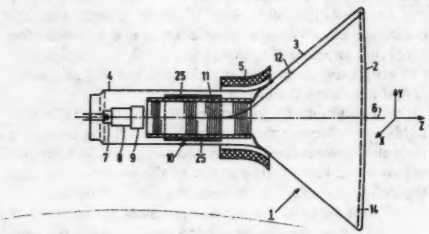
Gerardus A. H. M. Vrijssen, and Willem Van Alphen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 8, 1990, Ser. No. 461,886

Claims priority, application Netherlands, Jan. 12, 1989, 8900068

Int. Cl.[5] G09G *1/04*; H01J *29/58, 29/46*

U.S. Cl. 315—382 **2 Claims**



1. A picture display device comprising a cathode ray tube including a display screen and an electron gun for producing at least one electron beam directed at the screen, said tube being adapted for the attachment of deflection means for deflecting the electron beam across the screen, characterized in that the electron gun comprises:

a. a beam shaping pat including cathode for emitting electrons and electrode means for forming the electrons into said beam;

b. a tubular structure of insulating material through which the electron beam is affected, said tubular structure including an inner surface on which is disposed a helical resistive layer of a material having a high electrical resistance for producing an electrical focusing lens field when a voltage is applied to said resistive layer;

c. a surface electrode disposed on an outer surface of the tubular structure and extending over at least a portion of the helical resistive layer, said surface electrode, said portion of the layer and the insulating material of the tubular structure which is disposed between said surface electrode and said portion forming a capacitor;

d. first voltage supplying means for applying a static focusing voltage to the helical resistive layer to effect static focusing of the electron beam; and

e. second voltage supplying means for applying a dynamically variable focusing voltage to the surface electrode, said voltage being coupled through said capacitor to the helical resistive layer to effect dynamic focusing of the electron beam.

4,988,929

PICTURE DISPLAY DEVICE

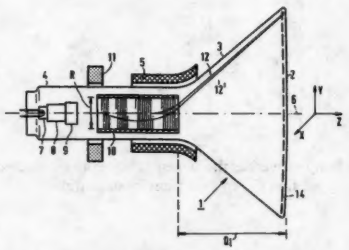
Tjerk G. Spanjer; Gerardus A. H. M. Vrijssen, and Willem M. Van Alphen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 8, 1990, Ser. No. 462,151

Claims priority, application Netherlands, Jan. 12, 1989, 8900067

Int. Cl.[5] H01J *29/58*

U.S. Cl. 315—382 **5 Claims**



1. A picture display device comprising a display tube having a display screen and an electron gun facing said screen and having a cathode centered along an electron-optical axis and a plurality of electrodes which jointly constitute a beam-forming part for generating an electron beam, said gun further comprising an electrostatic focusing lens for generating a focusing lens field, said tube further comprising deflection means for generating a deflection field which overlaps at least a part of the focusing lens field, characterized in that the focusing lens comprises a tubular structure having an inner surface on which a helical resistance structure of a material having a high electrical resistance is provided, said tubular structure having a coaxial input portion and a coaxial output portion, the output portion extending into the deflection field to the extent that said field effects deflection of the electron beam within the tubular structure, said output portion being dimensioned to prevent the deflected electron beam from impinging upon the glass of the inner surface.

4,988,930

PLURAL MOTOR FAN SYSTEM WITH IMPROVED SPEED CONTROL

George C. Oberheide, 4401 Deacon Ct., Troy, Mich. 48098

Filed Apr. 25, 1990, Ser. No. 514,238

Int. Cl.[5] H02P *7/68*

U.S. Cl. 318—82 **20 Claims**

1. A two motor assembly for driving two fan blades to move air through a heat exchanger for an automotive engine comprising:

a first two speed DC motor comprising

means for establishing a first fixed magnetic motor field;

armature rotor means rotatable to drive a first fan blade;

a multiplicity of armature coil turns on said armature rotor means;

commutator means on said armature rotor means electrically connected with said multiplicity of armature coil turns and;

brush means including tap brush means cooperating with said commutator means to alternatively operate said first two speed DC motor (1) in a first speed mode wherein (A) a system voltage is applied and distributed across all of said multiplicity of armature coil turns to produce a net total back electro-motive force (EMF) and armature reaction interacting with said first magnetic field to cause said armature rotor means to rotate in said first speed mode and (B) a tap voltage intermediate the system voltage reduced across a predetermined number of armature coil turns less than all of the multiplicity of armature coil turns

is provided through said tap brush means and (2) a different second speed mode;

a second DC motor including rotor means for driving a second fan blade and cooperating field means and armature coil means for rotating said rotor means;

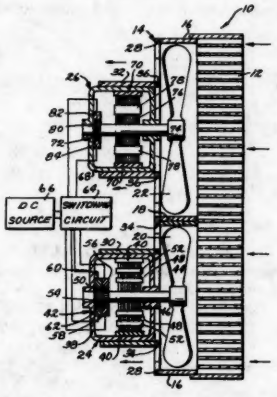
and means for alternatively (1) applying said tap voltage across the armature coil means of said second DC motor so as to operate said second DC motor in a first speed mode when said first two speed DC motor is operated in the first speed mode thereof and (2) applying a system voltage across the armature coil means of said second DC motor so as to operate said second DC motor in a second speed mode when said first two speed DC motor is operated in said second speed mode.

13. A fan system for use in moving air through a heat exchanger for an automotive engine comprising

shroud means adapted to be operatively associated with the heat exchanger so as to receive air after it has passed through the heat exchanger,

said shroud means having air discharge opening means therein for allowing air received therein which has passed through the heat exchanger to be discharged therefrom,

separate first and second fan blade means mounted for separate rotational movement within said shroud means to cause air to flow into the shroud means through the heat



exchanger and to flow out of the shroud means through the discharge opening means thereof,

a first two speed DC motor having armature rotor means rotatable to drive said first fan blade means, said first motor comprising

means for establishing a first fixed magnetic field;

a multiplicity of armature coil turns on said armature rotor means;

commutator means on said armature rotor means electrically connected with said multiplicity of armature coil turns and;

brush means including tap brush means cooperating with said commutator means to alternatively operate said first two speed DC motor (1) in a first speed mode wherein (A) a system voltage is applied and distributed across all of said multiplicity of armature coil turns to produce a net total back electro-motive force and armature reaction interacting with said first magnetic field to cause said armature rotor means to rotate in said first speed mode and (B) a tap voltage intermediate the system voltage reduced across a predetermined number of armature coil turns less than the entire multiplicity of armature coil turns is produced through said tap brush means and (2) a different second speed mode;

a second DC motor including rotor means rotatable to drive said second fan blade means and cooperating field means and armature coil means for rotating said rotor means;

and means for alternatively (1) applying said tap voltage across the armature coil means of said second DC motor so as to operate said second DC motor in a first speed mode when said first two speed DC motor is operated in the first speed mode thereof and (2) applying a system voltage across the armature coil means of said second DC motor so as to operate said second DC motor in a second speed mode when said first two speed DC motor is operated in said second speed mode.

4,988,931

MOTOR DRIVING DEVICE

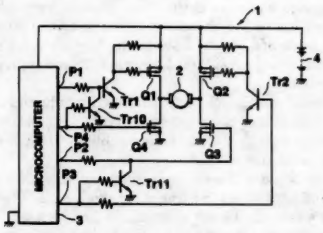
Akihiko Tsukahara; Toshio Iwaoka; Yuichi Yamaguchi, and Tsutomu Danzaki, all of Yokohama, Japan, assignors to Jidosha Denki Kogyo Kabushiki Kaisha, Yokohama, Japan

Filed Jan. 26, 1990, Ser. No. 470,502

Claims priority, application Japan, Jan. 27, 1989, 1-19234

Int. Cl.[5] H02P 1/22

U.S. Cl. 318—293 **4 Claims**



1. A motor driving device for rotating a bi-directional electric motor in forward and reverse directions comprising:

a transfer bridge circuit including first and fourth switching transistors connected in series with each other, and second and third switching transistors connected in series with each other;

the bi-directional electric motor is connected between a first junction of said first and fourth switching transistors and a second junction of said second and third switching transistors;

a first NPN transistor having a collector electrode connected to a control electrode of said first switching transistor and an emitter electrode which is grounded;

a second NPN transistor having a collector electrode connected to a control electrode of said second switching transistor and an emitter electrode which is grounded;

signal producing means having a first output port connected to a base electrode of said first NPN transistor, a second output port connected to a control electrode of said third switching transistor, a third output port connected to a base electrode of said second NPN transistor, and fourth output port connected to a control electrode of said fourth switching transistor, for supplying output signals to said first and second NPN transistors and said third and fourth switching transistors;

said motor rotates in a forward direction when said first and third switching transistors are conductive and in a reverse direction when said second and fourth switching transistors are conductive;

a first lock-out transistor having a collector electrode connected to the base electrode of said first NPN transistor, an emitter electrode which is grounded and a base electrode connected to the fourth output port of said signal producing means, said first lock-out transistor prevents said first switching transistor from conducting when said fourth switching transistor is conducting; and

a second lock-out transistor having a collector electrode connected to the control electrode of said third switching

transistor, an emitter electrode which is grounded and a base electrode connected to the third output port of said signal producing means, said second lock-out transistor prevents said third switching transistor from conducing when said second switching transistor is conducting.

4. A motor driving device for rotating a bi-directional electric motor in forward and reverse directions comprising;

a transistor bridge circuit including first and fourth switching transistors connected in series with each other, and second and third switching transistors connected in series with each other;

the bi-directional electric motor is connected between a first junction of said first and fourth switching transistors and a second junction of said second and third switching transistors;

a fifth switching transistor connected to a control electrode of said first switching transistor;

a sixth switching transistor, connected to a control electrode of said second switching transistor;

signal producing means having a first output port connected to a control electrode of said fifth switching transistor, a second output port connected to a control electrode of said third switching transistor, a third output port connected to a control electrode of said sixth switching transistor, and a fourth output port connected to a control electrode of said fourth switching transistor, for supplying output signal to said third, fourth, fifth and sixth switching transistors;

said motor rotates in a forward direction when said first and third switching transistors are conducting and rotates in a reverse direction when said second and fourth switching transistors are conducting;

a first lock-out transistor connected to the control electrode of said fifth switching transistor and fourth output port of said signal producing means, said first lock-out transistor prevents said first switching transistor from conducting when said fourth switching transistor is conducting;

a second lock-out transistor connected to the control electrode of said third switching transistor and third output port of said signal producing means, said second lock-out transistor prevents said third switching transistor from conducing when said second switching transistor is conducting; and

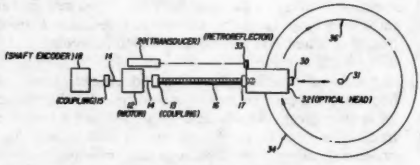
wherein said first and second lock-out transistors prevent said first and third switching transistors from conducting and cause said second and fourth switching transistors to conduct when said first, second, third and fourth output ports are supplying the same positive output signal.

4,988,932

CONSTANT VELOCITY SERVOSYSTEM WTIH HIGH POSITIONAL ACCURACY

William R. Markis; James M. Papa, and Michael T. Murray, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 10, 1989, Ser. No. 419,171
Int. Cl.[5] G11B *21/10*
U.S. Cl. 318—560 **7 Claims**



1. A constant velocity servosystem comprising:

a first movable member;

motor means for providing motion to said first movable member;

position transducer means for providing a position signal indicative of the position of said first movable member;

first encoder means coupled to said motor means for providing a first encoder signal indicative of the motion of said motor means;

a second movable member;

second encoder means coupled to said second movable member for providing a second encoder signal indicative of the position of said second movable member;

a phase locked loop means for receiving said first and said second encoder signals for providing a drive signal for controlling the motion of said motor means as a function of the difference between said first and said second signals;

computer means receiving as inputs said position signal from said position transducer means and said second encoder signal and data representing a desired path of said first movable member with respect to said second movable member, for computing a first path and a second path which lie on either side of the desired path, said computer means referencing the signals on its inputs determining the position of said first movable member with reference to said first and second paths to provide a correction signal of a first magnitude and direction when approaching said first path and of a first magnitude and opposite direction when approaching said second path; and

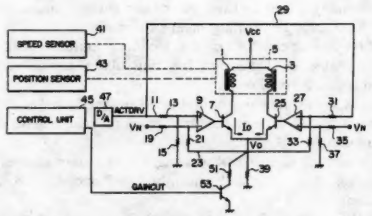
means for applying said provided correction signal to said phase locked loop means for incorporation into said drive signal.

4,988,933

HEAD DRIVING CIRCUIT

Tomihisa Ogawa, Ome, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 19, 1989, Ser. No. 353,943
Claims priority, application Japan, May 31, 1988, 63-133625
Int. Cl.[5] G05B *13/00*
U.S. Cl. 318—561 **7 Claims**



1. A head driving apparatus in a data storage apparatus, the data storage apparatus including a recording medium and a head disposed adjacent to the recording medium, comprising:

a voice coil motor for moving the head to a plurality of predetermined positions adjacent to the recording medium,

driving means for supplying an exciting current to said voice coil motor in response to a drive signal and a gain selection signal,

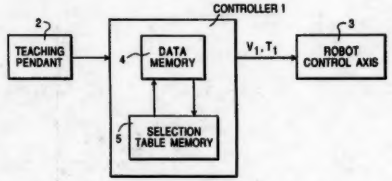
gain control means for producing said gain selection signal, said gain selection signal corresponding to a high gain in a seek mode and corresponding to a low gain in a track-following mode.

4,988,934

ROBOT CONTROL APPARATUS

Kenichi Toyoda, Hino; Nobutoshi Torii, Hachioji; Ryo Nihei, Oshino, and Jun Kikuchi, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Filed Mar. 22, 1989, Ser. No. 332,272
Claims priority, application Japan, Sep. 9, 1987, 62-225598
Int. Cl.[5] G05B *19/42*
U.S. Cl. 318—568.15 4 Claims



1. A robot control apparatus for controlling a plurality of drive axes simultaneously by outputting a drive command to a motor having an acceleration/deceleration function, comprising:

memory means for storing teach data which stipulates a type of motion of a robot arm from a starting point to an end point;

arithmetic means for deciding maximum velocity and an acceleration/deceleration time constant along each drive axis in that a load which will act upon each axial motor will attain a maximum output of the respective motor during motion between taught points; and

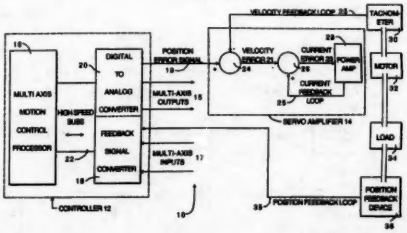
command means for forming, from said stored teach data, a drive command for each axial motor within said decided maximum velocity and having the respective acceleration/deceleration time constant.

4,988,935

ADVANCED DIGITAL MOTION CONTROL

James E. York, Endicott, N.Y., assignor to Universal Instruments Corporation, Binghamton, N.Y.

Filed May 24, 1989, Ser. No. 356,372
Int. Cl.[5] G05B *19/407*
U.S. Cl. 318—568.18 11 Claims



1. An advanced digital motion control system for providing multi-axis single microprocessor closed loop point to point positioning to a servo motor system with acceleration, deceleration and velocity control, said system comprising:

precalculation means for precalculating a reference position motion profile and servo gain coefficients for each of a plurality of axes;

calculating means for calculating the position and velocity at discrete time intervals to determine a real time motion profile for a plant being controlled;

comparison means for comparing the plant real time motion profile to said reference motion profile; and

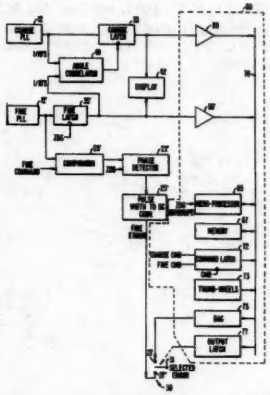
error adjustment means for adjusting the error along each individual axis by adding a controlled amount of gain to the servo motor system to reduce the error to zero, thereby commanding each of said axes to be at a certain target position at a certain time throughout the point to point positioning of the servo motor system.

4,988,936

CORRELATED COARSE POSITION ERROR PROCESSOR

Rudy L. Schneider, Santa Clara, Calif., assignor to Carco Electronics, Menlo Park, Calif.

Filed Aug. 21, 1989, Ser. No. 396,597
Int. Cl.[5] G05B *11/18*
U.S. Cl. 318—632 6 Claims



1. Apparatus for generating a position error signal at an error output terminal comprising:

means for generating a coarse position signal over a coarse position range with a coarse position resolution;

means for generating a fine position signal over a fine position range with a fine position resolution;

said coarse and fine position ranges and resolutions being such that particular portions of said coarse and fine position signals have a common range of precision;

means for generating coarse and fine position commands;

means for generating a reference clock signal;

fine latch means, responsive to said reference clock signal, for latching said fine position signal to provide a latched fine position value;

correlation means, responsive to signals representing corresponding digits in said coarse position signal and said latched fine position value, for generating a correlation output signal when the particular portion of said coarse position error becomes equal to the particular portion of said latched fine position value;

coarse latch means, responsive to said correlation output signal, for latching said coarse position signal to provide a latched coarse position value;

means for combining said latched coarse position value and latched fine position value to provide a correlated position value;

means for combining said coarse and fine position commands to provide a combined position command value;

means for generating a correlated coarse position error proportional to the difference between said correlated coarse position value and said combined position command value;

means, responsive to said fine position signal and said fine position command, for generating a fine position error; and

selector means, coupled to said error output terminal and responsive to said fine position error and said correlated

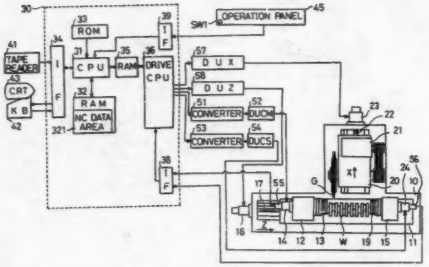
coarse position error for applying said fine position error to said error output terminal when said correlated coarse position error is within a particular range and for applying said correlated coarse position error to said error output terminal when said correlated coarse position error is outside said particular range.

4,988,937

SYNCHRONOUS CONTROL SYSTEM AND METHOD THEREFOR

Takao Yoneda, Nagoya; Hiroshi Nakano, Toyota, and Toshihiro Yonezu, Nishio, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Feb. 27, 1990, Ser. No. 485,567
Claims priority, application Japan, Feb. 28, 1989, 64-49473
Int. Cl.[5] G05B *11/06*; H02P *7/74*; B24B *47/00*
U.S. Cl. 318—675 **4 Claims**



1. A method for controlling rotational positions of a master spindle and a slave spindle, wherein said method comprises:

detecting the current positions of said master and slave spindles;

comparing the detected current positions of said master and slave spindles in order to judge which one of said master and slave spindles precedes to the other in the forward rotational direction;

setting the current position of preceding one of said main and slave spindles as a common target position for said master and slave spindles; and

rotating the other of said main and slave spindles to the common target position in order to position said master and slave spindles at the same rotational angle.

2. A synchronous control system for synchronously controlling positions of rotation of a pair of main spindles including a master spindle and a slave spindle between and by which a work is to be supported for rotation at the opposite end faces thereof so as to provide a turning force to the work, comprising:

a first position detector for detecting a current position of said master spindle;

a second position detector for detecting a current position of said slave spindle;

target position setting means for setting that one of the master spindle current position and the slave spindle current position detected by said first and second position detectors, respectively, which precedes to the other in the forward direction of rotation as a common target position to said master spindle and said slave spindle; and

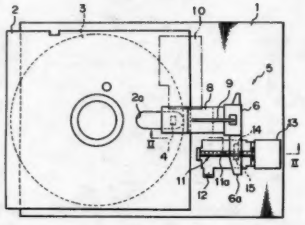
instruction signal developing means for developing, when a positioning instruction is received, an instruction signal for instructing a rotational movement of one of the main spindles which follows the other of the main spindles in the forward direction of rotation to the common target position set by said target position setting means.

4,988,938

SYSTEM FOR CONTROLLING THE DRIVING OF A STEPPER MOTOR

Yukihiro Ito; Takashi Kimura, and Reiji Hoshika, all of Tokyo, Japan, assignors to Copal Co. Ltd., Tokyo, Japan

Filed Jan. 8, 1990, Ser. No. 462,067
Claims priority, application Japan, Jan. 13, 1989, 1-7323
Int. Cl.[5] H02P *8/00*
U.S. Cl. 318—696 **1 Claim**



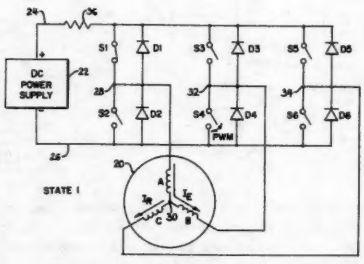
1. A system for controlling the driving of a stepper motor which is rotated by pulses generated based on a two-phase excitation system for rotating a driven system, CHARACTERIZED IN THAT when the frequency of said driving pulses is outside of the resonance ranges of said stepper motor and predetermined, component parts of said driven system, respectively, applying the driving pulses generated based on said two-phase excitation system to said stepper motor to rotate the same, but when the frequency of said driving pulses is within said resonance. ranges, adding a brake pulse and a power suppression portion of a noise suppression pattern to said driving pulses so that said stepper motor rotate without causing resonance.

4,988,939

ELECTRIC MOTOR WITH VARIABLE COMMUTATION DELAY

Jerome J. Reichard, Menomonee Falls, and John G. Reichard, Milwaukee, both of Wis., assignors to Thor Technology Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 389,874, Aug. 4, 1989. This application Aug. 29, 1989, Ser. No. 400,460
Int. Cl.[5] H02P *6/02*
U.S. Cl. 318—800 **21 Claims**



1. A method of controlling an electric motor having three phases, A, B, and C, comprising energizing the phases with energization current in a cyclic sequence comprising a plurality of states, 1, 2, 3, and so on, wherein during each state, two of the phases are energized and the third phase is unenergized, such that upon commutation from the state 1 to the state 2, current through the phase B is equal to a sum of energization current through the phase C plus inductive current through the phase A due to energization thereof in the state 1, said sum of said currents causing potentially destructive current spikes

upon said commutation to the state 2, said method comprising providing a variable commutation delay interval between commutations from state to state during which delay interval all phases are unenergized to minimize said current spikes upon commutation, and varying the duration of said delay interval according to a given motor operating parameter during operation of said motor to optimize said delay for different operating conditions, to provide maximum delay when needed to eliminate said current spikes, and to provide minimum delay when unneeded, to in turn provide maximum energization current to said phases.

4,988,940

METHOD FOR THE FORMATION OF THE ACTUAL LOAD ANGLE VALUE FOR A FIELD-ORIENTED REGULATED ROTARY FIELD MACHINE AND CORRESPONDING REGULATION

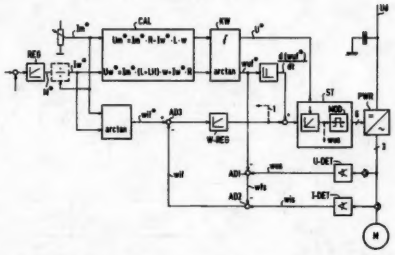
Leonhard Reng, Herzogenaurach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Continuation of Ser. No. 295,225, Jan. 9, 1989, abandoned. This application May 29, 1990, Ser. No. 530,441

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802704

Int. Cl.[5] H02P *5/40*

U.S. Cl. 318—800 **2 Claims**



1. A method for the formation of an actual load angle value (wif) for field-oriented regulation of a converter-fed rotating field machine (M), comprising the steps of forming from a field-oriented actual current vector (I*) which is available in the form of two orthogonal actual current component values (I^*_m, I^*_w), said rotating field machine having a stator-resistance (R), a scatter inductivity (L) and a main inductivity (LH), two orthogonal nominal voltage component values (U^*_m, U^*_w) of a field-oriented nominal voltage value (U*) for the converter (PWR), said two orthogonal nominal voltage component values being calculated by a decoupling computing unit (CAL), determining from measured phase currents and measured phase voltages respective orthogonal actual current component values and orthogonal actual voltage component values, calculating from said orthogonal actual current component values an orthogonal actual voltage component values a respective stator-oriented actual current angle (wis) and a stator-oriented actual voltage angle (wus), calculating from the calculated nominal voltage component values (U^*_m, U^*_w) a field-oriented nominal voltage component value (U^*_m, U^*_w) (wuf*), deducting the field-oriented nominal voltage component value from the determined stator-oriented actual voltage angle (wus), resulting in a stator-oriented field angle (wfs), deducting the stator-oriented field angle from the determined stator-oriented actual current angle (wis), resulting in the actual load angle value (wif).

4,988,941

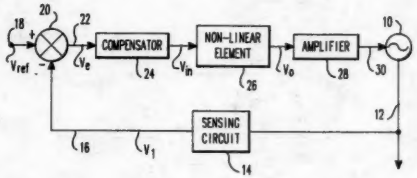
GENERATOR VOLTAGE REGULATION WITH NON-LINEAR COMPENSATION

David A. Fox, Shawnee Township, Allen County, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 290,344, Dec. 29, 1988, abandoned. This application Jul. 13, 1990, Ser. No. 554,095

Int. Cl.[5] H02J *7/14*

U.S. Cl. 322—28 **8 Claims**



5. A voltage regulator for regulating the output voltage of a variable speed electric generator, said voltage regulator comprising:

means for producing a first signal representative of the actual output of the generator;

means for combining said first signal with a reference signal to obtain a control signal which varies in proportion to the difference between a desired output of said generator and said actual output of said generator;

means for modifying said control signal by a non-linear transfer function which is representative of the gain of said generator over an expected operating speed and load range of said generator, such that the magnitude of the modified control signal is a non-linear function of the magnitude of the control signal; and

means for controlling the current in an exciter field winding of said generator in response to the modified control signal, thereby causing said actual output to approach said desired output.

4,988,942

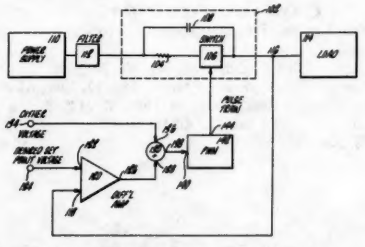
SWITCHED RESISTOR REGULATOR CONTROL WHEN TRANSFER FUNCTION INCLUDES DISCONTINUITY

John P. Ekstrand, Palo Alto, Calif., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Nov. 8, 1988, Ser. No. 269,238

Int. Cl.[5] G05F *1/56*

U.S. Cl. 323—282 **47 Claims**



1. A switched resistor regulator, comprising

means for receiving a signal indicative of a duty cycle; and

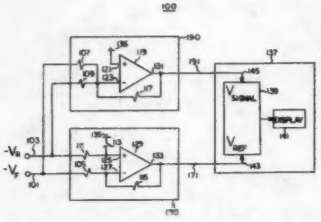
means responsive to said signal for periodically switching according to an average duty cycle equal to said duty cycle, by periodically switching according to said duty cycle and according to a predetermined first period, and by periodically switching according to a minimum duty cycle and a second period when said signal indicates a duty cycle less than said minimum duty cycle.

4,988,943

VSWR METER ARRANGEMENT WITH A DISPLAY OUTPUT HAVING A LINEAR SCALE

Harry D. Bush, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 25, 1989, Ser. No. 398,693
Int. Cl.[5] G01R *7/04*
U.S. Cl. 324—140 D **6 Claims**



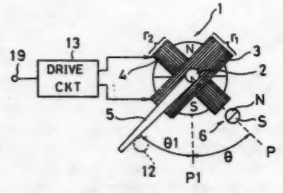
1. An improved VSWR meter arrangement with a display output having a linear scale, comprising:
- a voltmeter/display unit (137) having a V_{signal} input (145) and a $V_{reference}$ input (143) that may be controlled by the user;
- means for providing $-V_{forward}$ (101) and $-V_{reverse}$ (103) signals;
- means for coupling said $-V_{forward}$ and $-V_{reverse}$ signals to a first subtracting and multiplying circuit (170) to provide a first output (171) equal to $K(V_f-V_r)$ where K is a predetermined constant;
- means for coupling said $-V_{forward}$ and $-V_{reverse}$ signals to a second adding circuit (190) to provide a second output (191) equal to (V_f+V_r);
- means for coupling said first output to said $V_{reference}$ input of said voltmeter/display unit;
- means for coupling said second output to said V_{signal} input of said voltmeter/display unit;
- said first subtracting and multiplying circuit (170) comprising a first analog amplifier unit (129),
- said second adding circuit (190) comprising a second analog operational amplifier unit (119);
- said voltmeter/display unit (137) comprising a voltmeter (139) coupled to a display unit (141), said display unit (141) indication the VSWR as a linear percentage of scale;
- said voltmeter/display unit (137) being directly connected to said first analog amplifier unit (129) and said second analog operational amplifier unit (119).

4,988,944

CROSS COIL TYPE INSTRUMENT

Akio Ito, Konosu, Japan, assignor to Jeco Company Limited, Japan

Filed Aug. 2, 1989, Ser. No. 388,588
Claims priority, application Japan, Aug. 12, 1988, 63-200061; Sep. 14, 1988, 63-120679; Sep. 28, 1988, 63-242948
Int. Cl.[5] G01P *1/00*
U.S. Cl. 324—154 PB **13 Claims**



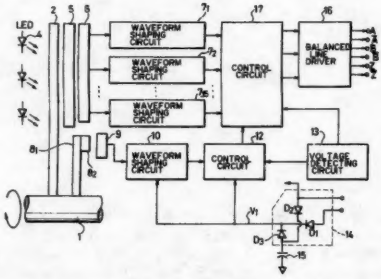
1. A cross coil type instrument comprising:
- a movable permanent magnet;
- a plurality of coils cross-arranged around the movable permanent magnet;
- a needle fastened to said movable permanent magnet through a shaft projecting from said movable permanent magnet and penetrating said coils;
- a reset-to-zero permanent magnet arranged in the vicinity of said movable permanent magnet;
- a stopper positioned so as to make contact with said needle at a reference indication position when said movable permanent magnet is driven only by said reset-to-zero permanent magnet; and
- drive means for receiving an input signal related to a quantity to be measured and generating drive signals to be supplied to the respective coils based on said input signal so that a composite magnetic field formed by said coils presents a first error in deflection angle of said movable permanent magnet, and an error obtained by adding said first error in deflection angle and a second error in deflection angle due to said reset-to-zero permanent magnet changes linearly as a function of an electrical angle of said drive signals.

4,988,945

OPTICAL AND MAGNETIC ENCODER FOR SERIALLY TRANSMITTING ABSOLUTE POSITION SIGNALS WITH AN AUXILIARY POWER SUPPLY

Takashi Nagase, Iramu, Japan, assignor to Kabushiki Kaisha Yaskawa Denki Seisakusho, Kitakyushu, Japan

Filed Mar. 9, 1988, Ser. No. 165,843
Int. Cl.[5] G01P *3/36;* **G01D** *5/34*
U.S. Cl. 324—175 **6 Claims**



1. A rotation type absolute encoder in which a magnetic type one-pulse encoder for detecting the number of rotations and the direction of rotation and an optical type absolute encoder for detecting an absolute angle within one rotation are combined on the same shaft, the absolute angle of rotations of said shaft is detected on the basis of detection signals of said encoders, and when a current which is supplied to said encoders is cut, a current is supplied from an external auxiliary power source to said one-pulse encoder and to an electronic circuit to measure the detection amount of the one-pulse encoder comprising:
- a power source voltage detecting circuit for detecting whether the power source voltage has reached a predetermined voltage value when the power source is turned on; and
- a control circuit for first serially transmitting a signal indicating the number of rotations to an external controller when the power source voltage has reached the predetermined voltage or more and, thereafter, for transmitting a signal indicating the absolute angle within one rotation by square wave signals of two phases having a phase difference of 90°.

4,988,946

PARAMAGNETIC GAS MEASURING APPARATUS

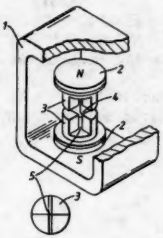
Riad M. A. Kocache, and Danny F. Holman, both of East Sussex, England, assignors to Servomex (UK) Ltd., England

PCT No. PCT/GB89/00689, § 371 Date Jan. 19, 1990, § 102(e) Date Jan. 19, 1990, PCT Pub. No. WO89/12821, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 20, 1989, Ser. No. 458,633

Int. Cl.[5] G01N *31/00, 27/74;* G01R *33/12*

U.S. Cl. 324—204 8 Claims



1. A gas testing apparatus comprising a body (13, 14) defining a chamber (7), means (2,3) for creating a magnetic filed within the chamber in a first direction, a test body (20), means (19) for mounting the test body (20) in said chamber (7) for rotation about an axis parallel to the direction of the magnetic field, and gas inlet (9) and outlet (10) means for allowing gas flow through the chamber (7), characterized in the the gas inlet means (9) are arranged and disposed to supply gas to the chamber (7) from two positions at opposite sides of the chamber whereby gas flow from each of the two positions will be parallel to the direction of the magnetic field but in opposition in order to minimize errors resulting from gas flow upon the test body 20.

4,988,947

AMPLITUDE AND FREQUENCY/PHASE MODULATED PULSES TO ACHIEVE PLANE ROTATIONS OF NUCLEAR SPIN MAGNETIZATION VECTORS WITH INHOMOGENEOUS B_1 FIELDS

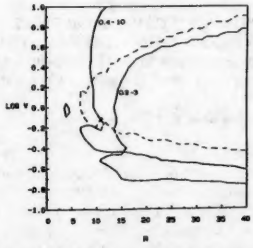
Kamil Ugurbil, Maple Plaine, and Michael Garwood, Minneapolis, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation of Ser. No. 32,059, Mar. 27, 1987, Pat. No. 4,914,392. This application Sep. 13, 1989, Ser. No. 406,758

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—307 20 Claims



1. A method for executing a plane rotation of magnetic spins in matter under the influence of a spin aligning magnetic field B_0, said magnetic spins having a Larmor frequency ω_0, said method comprising the steps of:

(a) providing a coil responsive to electrical energization to generate a B_1 field;

(b) orienting said coil so that the B_1 field generated by said coil has components transverse to said B_0 field;

(c) energizing said coil to generate an RF adiabatic pulse providing said B_1 field, wherein when the frequency of said pulse deviates from ω_0 said spins encounter an additional magnetic field $\Delta\omega$ to create said effective field B_1^e defined as $(B_1^2+\Delta\omega^2)^{\frac{1}{2}}$, said pulse generated to cause a flip in the effective field B_1^e in said matter so that said magnetic spins undergo a plane rotation.

4,988,948

METHOD FOR THE AUTOMATIC LINE CALIBRATION OF A SENSOR FOR MEASURING THE CONCENTRATION OF A LIQUID PHASE DISSOLVED ELECTROCHEMICAL SUBSTANCE

Jean-Louis Francard, Magny les Hameaux, France, assignor to Technicatome Societe Technique pour l'Energie Atomique, France

Filed Jun. 15, 1989, Ser. No. 366,784

Claims priority, application France, Jun. 15, 1988, 88 08000

Int. Cl.[5] G01N *27/27, 27/31*

U.S. Cl. 324—444 5 Claims

1. A method of automatically calibrating an electrochemical sensor that measures the concentration of a dissolved liquid phase electrochemical substance constituting a liquid flowstream flowing in a pipe, said method including the following steps:

placing on the pipe carrying the liquid flowstream to be monitored upstream of the electrochemical sensor, a generator suitable for injecting into the liquid flowstream standard quantities of the substance whose concentration is desired to be measured;

placing a delay line having a given volume in the same flow path between said generator and the electrochemical sensor;

operating the generator to inject successively into the liquid flowstream two bursts of known quantities of the electrochemical substance corresponding to the concentrations C_1 and C_2 in the liquid flowstream;

determining from the indications of the electrochemical sensor, the delay T introduced by said delay line for each burst and deducing from the delay times the liquid flow rate Q; and

calculating the meter constant K of the sensor for the substance concentration as indicated by the sensor by producing the ratio of the difference of the indications of the sensor to the difference of the concentrations C_2–C_1.

4,988,949

APPARATUS FOR DETECTING EXCESSIVE CHAFING OF A CABLE ARRANGEMENT AGAINST AN ELECTRICALLY GROUNDED STRUCTURE

Robert A. Boenning, Timonium, and Harvey H. White, Jr., Hampstead, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 15, 1989, Ser. No. 351,498

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—541 21 Claims

1. Apparatus for detecting excessive chafing of a cable arrangement against an electrically grounded structure, comprising:

an elongated member of preselected length having a pair of opposing end portions and an outer surface extending therebetween;

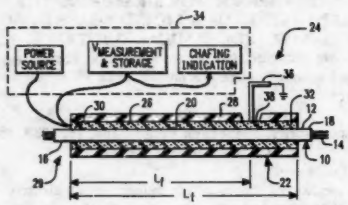
a layer of semiconductive material positioned in surrounding relation with said outer surface on said elongated member and extending over a predetermined length of said member, said layer of semiconductive material including a first reference end portion and an opposite second end portion;

a layer of electrically insulating material surrounding said layer of semiconductive material;

said elongated member, layer of semiconductive material and layer of electrically insulating material forming said cable arrangement;

detector circuit means electrically connected with said layer of semiconductive material at said reference end portion thereof; and

said detector circuit means including means for detecting at least momentary contact between said layer of semiconductive material and said electrically grounded structure due to erosion of said layer of electrically insulating material caused by excessive chafing of said layer of electrically insulating material against said grounded structure;



whereby said contact between said layer of semiconductive material forming a portion of said cable arrangement and said electrically grounded structure is detected by said detector circuit means prior to actual chafing of said elongated member against said electrically grounded structure;

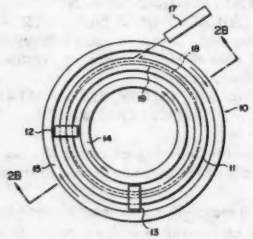
said detector circuit means further including means for providing, in response to detecting of said at least momentary contact between said layer of semiconductive material and said grounded structure, an output in the form of a voltage signal proportional to the distance measured along said layer of semiconductive material between said reference end portion and the location at which said layer of semiconductive material contacts said grounded structure.

4,988,950

ELECTRON SYNCHROTRON ACCELERATING APPARATUS

Koichi Nakayama, Musashino, and Yoshio Gomei, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 21, 1989, Ser. No. 369,073
Claims priority, application Japan, Jun. 21, 1988, 63-152828
Int. Cl.[5] H05H *7/08, 13/04*
U.S. Cl. 328—235 **5 Claims**



1. An electron synchrotron accelerating apparatus comprising:

an accelerating orbit;

a superconducting magnet for applying deflecting magnetic fields in the accelerating orbit; and

an electron injector for injecting low-energy electron beams of 40 MeV or less into the accelerating orbit, said electron injector being adapted to inject the electron beams a plurality of times for each predetermined period of time,

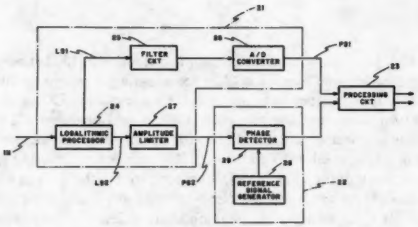
wherein the radiation damping time is shorter than the beam lifetime, so that the electron beams are injected a plurality of times before the lifetime of the injected electron beams terminates, whereby the electron beams are accumulated, and accumulated electron current is increased to a predetermined value.

4,988,951

QUADRATURE PHASE DEMODULATOR CAPABLE OF OPERATING UNDER A WIDE INPUT DYNAMIC RANGE

Hideho Tomita, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 24, 1990, Ser. No. 513,826
Claims priority, application Japan, Apr. 25, 1989, 1-106230
Int. Cl.[5] H03D *3/00*
U.S. Cl. 329—345 **7 Claims**



1. A demodulator for demodulating into a demodulated signal a quadrature phase modulated signal, that operates on receiving an input signal, as a demodulator input signal, with a large varying amplitude caused by various radio transmission link conditions, wherein the improvement comprises:

preprocessing means responsive to said quadrature phase modulated signal for logarithmically processing said demodulator input signal to produce a first preprocessed signal and for limiting said amplitude to multiple values to produce a second preprocessed signal;

phase detecting means connected to said preprocessing means for detecting a phase difference between a reference signal having a reference frequency and said second preprocessed signal to produce a phase difference signal representative of said phase difference; and

processing means connected to said preprocessing means and said phase detecting means for processing said first preprocessed signal and phase difference signal to produce first and second processed signals collectively as said demodulated signal.

4,988,952

HIGH Q SWITCHED CAPACITOR FILTER HAVING INTERNAL THIN-FILM RESISTORS

Nello G. Sevastopoulos, and Robert C. Dobkin, both of San Jose, Calif., assignors to Linear Technology Corporation, Milpitas, Calif.

Filed Jun. 6, 1989, Ser. No. 362,144
Int. Cl.[5] H03F *1/34*
U.S. Cl. 330—51 **9 Claims**

1. A switched capacitor filter block comprising

a summing amplifier having an input and an output,

a first resistor (R2) connected between said output and said input of said summing amplifier,

a first integrator having an input and an output,

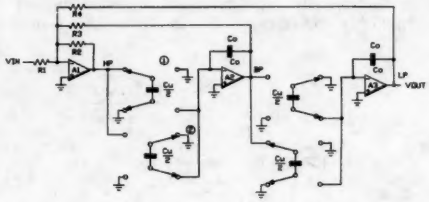
a first capacitor (C_O) connected between said output and said input of said first integrator,

a second resistor (R3) connected between said output of said first integrator and said input of said summing amplifier,

a first pair of capacitors ($C_I/2$) switchably connecting said output of said summing amplifier to said input of said first integrator, said first pair of capacitors being alternately connected to said output and to said input to thereby double the sampling rate of said first pair of capacitors,

a second integrator having an input and an output,

a second capacitor (C_O) connected between said output and said input of said second integrator,



a third resistor (R4) connected between said output of said second integrator and said input of said summing amplifier, and

a second pair of capacitors ($C_I/2$) switchably connecting said output of said first integrator to said input to said second integrator, said second pair of capacitors being alternately connected to said output and to said input to thereby double the sampling rate of said second pair of capacitors.

4,988,953

AMPLIFIERS WITH EFFECTIVELY ZERO INPUT CAPACITANCE

Bernard Bollons, Stratford-upon-Avon, United Kingdom, assignor to ABI Systems Limited, United Kingdom

Filed Jun. 14, 1989, Ser. No. 366,667

Claims priority, application United Kingdom, Jun. 14, 1988, 8814091

Int. Cl.[5] H03F *3/04*; G01L *9/12*

U.S. Cl. 330—261 **6 Claims**

1. An amplifier comprising a first integrated circuit differential amplifier, an input being connected to the noninverting input of said first amplifier; the output of said first amplifier being connected to its inverting input and to the non-inverting inputs of a second and third differential amplifier; the inverting input of the second differential amplifier being connected to a negative voltage source and its output being connected to the positive voltage supply of said first differential amplifier; the inverting input of the third differential amplifier being connected to a positive voltage source and its output being connected to the negative voltage supply of said first differential amplifier; a first zener diode being connected between the inverting input and output of the second differential amplifier and a second zener diode being connected between the inverting input and output of the third differential amplifier, the sum of the reference voltages of the zener diodes being equal to the supply voltage applied across said first differential amplifier.

4,988,954

LOW POWER OUTPUT STAGE CIRCUITRY IN AN AMPLIFIER

Kenneth J. Stern, and Stephen F. Bily, both of Austin, Tex., assignors to Crystal Semiconductor Corporation, Austin, Tex.

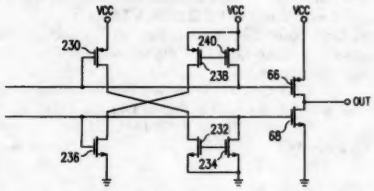
Filed Apr. 28, 1989, Ser. No. 345,320

Int. Cl.[5] H03F *3/26, 3/16*

U.S. Cl. 330—264 **19 Claims**

1. An amplifier output stage having a positive output and a negative output wherein said positive output is driven, at least in part, by a first output transistor coupled between a first reference voltage and said positive output, and said negative output is driven, at least in part, by a second output transistor coupled between said first reference voltage and said negative output, said amplifier output stage comprising:

(a) a first variable current shunt path coupled to a control terminal of said first output transistor, said first variable current shunt path being responsive to the voltage on a control terminal of said second output transistor such that the amount of current through said first variable current shunt path affects the conductivity of said first output transistor; and



(b) a second variable current shunt path coupled to said control terminal of said second output transistor, said second variable current shunt path being responsive to the voltage on said control terminal of said first output transistor such that the amount of current through said second variable current shunt path affects the conductivity of said second output transistor.

4,988,955

PHASE-LOCKED LOOP APPARATUS

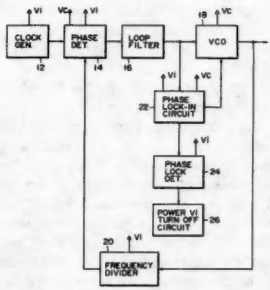
Hiroshi Horie, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 16, 1990, Ser. No. 480,927

Claims priority, application Japan, Feb. 17, 1989, 1-37968

Int. Cl.[5] H03L *7/08*

U.S. Cl. 331—11 **27 Claims**



1. A phase-locked loop apparatus comprising:

voltage controlled oscillating means including a first control voltage terminal and a second control voltage terminal having a sensitivity higher than that of said first control voltage terminal;

means for detecting a phase difference between a signal obtained by frequency-dividing an output signal from said voltage controlled oscillating means by a predetermined ratio and a reference signal;

first phase lock-in means for supplying a control voltage in accordance with an output from said phase difference detecting means to said first control voltage terminal of said voltage controlled oscillating means; and

second phase lock-in means for supplying a control voltage in accordance with an output from said first phase lock-in means to said second control voltage terminal of said voltage controlled oscillating means,

said second phase lock-in means comprising:

counter means for counting up or down a clock pulse in accordance with an output from said first phase lock-in means; and

digital/analog converting means for applying a voltage in accordance with an output value from said counter means to said control terminal of said voltage controlled oscillating means.

4,988,956

AUTO-RESONANT PENIOTRON HAVING AMPLIFYING WAVEGUIDE SECTION

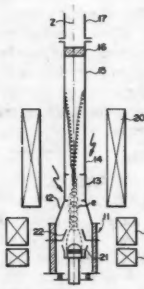
Shoichi Ono; Kuniyoshi Yokoo, both of Sendai, and Tadashi Okamoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Oct. 27, 1989, Ser. No. 427,473

Claims priority, application Japan, Oct. 31, 1988, 63-272941

Int. Cl.[5] H03B 9/08; H01J 25/44

U.S. Cl. 331—86 **4 Claims**



1. An extremely high frequency oscillator comprising:

beam-generating means for generating a beam of electrons and directing the electrons in a predetermined direction;

means for applying a DC magnetic field to the electrons generated by said beam-generating means, thereby causing each of the electrons to gyrate along the predetermined direction;

energy-converting means for causing the electrons to interact with an electromagnetic wave of TE mode, thereby to convert kinetic energy of the gyrating electrons into energy of the electromagnetic wave, said energy-converting means including a resonant cavity section and a propagating waveguide section connected to the resonant cavity section, auto-resonant conditions being preserved in the resonant cavity and propagating waveguide sections, the electromagnetic-wave being oscillated in said resonant cavity section and amplified in the propagating waveguide section, the electromagnetic wave in the resonant cavity section having a power level which is less than an output power of the electromagnetic wave from said propagating waveguide section; and

electro-collecting means for collecting the electrons from the propagating waveguide section.

4,988,957

ELECTRONICALLY-TUNED THIN-FILM RESONATOR/FILTER CONTROLLED OSCILLATOR

Philip H. Thompson, Santa Rosa, Calif.; Stanley G. Burns, Ames, and Robert J. Weber, Boone, both of Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 26, 1989, Ser. No. 358,624

Int. Cl.[5] H03B 5/32

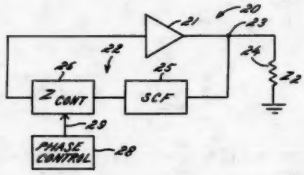
U.S. Cl. 331—107 A **16 Claims**

1. An electronically controlled oscillator comprising, in combination:

a non-linear element including an amplifier connected in a loop providing a loop gain of at least one at frequencies at which the oscillator is intended to oscillate,

a thin film stacked crystal filter having a resonant frequency in the rf/microwave frequency range and connected in the feedback path of the amplifier, the resonant frequency of the stacked crystal filter being in the range at which the oscillator is intended to oscillate, the stacked crystal filter having a phase-frequency characteristic with a substantially linear portion over a narrow frequency range,

an electronically variable impedance associated with the thin film stacked crystal filter in the feedback path of the



amplifier for adjusting the loop phase thereby to cause the loop to oscillate in said narrow frequency range in which the phase-frequency characteristic of the stacked crystal filter is substantially linear, and

electronically variable means coupled to the electronically variable impedance for controlling the impedance thereof and thereby causing the operating point of the stacked crystal filter to be controllably adjusted along the substantially linear portion of the phase-frequency characteristic to controllably adjust the operating frequency of the oscillator.

4,988,958

AMPLITUDE-CONTROLLED TRAPEZOIDAL WAVE GENERATING CIRCUIT

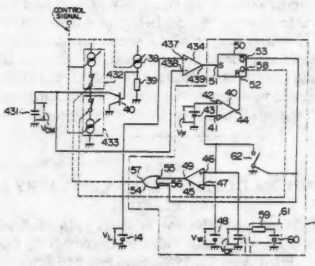
Tosiaki Tsuruoka, Tsu; Tatsuo Maeoka, Kobe, and Masafumi Nakamura, Tsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 342,881, Apr. 25, 1989, Pat. No. 4,947,312. This application May 8, 1990, Ser. No. 520,771

Claims priority, application Japan, Apr. 28, 1988, 63-106391; Jun. 9, 1988, 63-142146; Jun. 22, 1988, 63-153937; Jul. 27, 1988, 63-187218

Int. Cl.[5] H03K 4/00

U.S. Cl. 331—111 **4 Claims**



1. An amplitude-controlled trapezoidal wave generating circuit comprising:

first and second current sources connected in series and in parallel with a wave-forming capacitor, respectively and capable of being turned on and off optionally, with current values thereof being variable in interlinked relation with each other;

a voltage detection means for detecting a voltage of said wave-forming capacitor; and

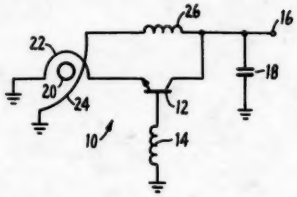
a timing control means triggerable by an output of said voltage detection means for generating a first and a second timing signal; whereby the end timing of the operation of said first current source and the start timing of the operation of said second current source are controlled by said timing control means, and the end timing of the operation of said second current source is controlled by a voltage level of said wave-forming capacitor.

4,988,959

YIG TUNED OSCILLATOR USING COMPOSITE FEEDBACK

Amarpal S. Khanna, San Jose, and Derek Davis, Palo Alto, both of Calif., assignors to Avantek, Inc., Milpitas, Calif.

Filed Oct. 31, 1989, Ser. No. 429,826
Int. Cl.[5] H03B 5/18
U.S. Cl. 331—117 D **8 Claims**



1. A YIG-tuned oscillator comprising:

a transistor capable of oscillating in the microwave-frequency range and capable of driving a load coupled to a first port thereof;

a reactive feedback element coupled to a second port of the transistor;

one or more YIG resonators including means for tuning the YIG resonators for resonance throughout a range of frequencies; and

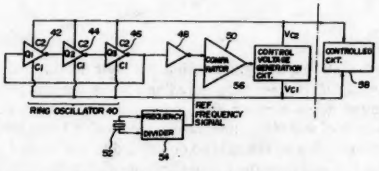
coupling means for coupling the one or more YIG resonators to a third port of the transistor and to the first port of the transistor for providing both series and parallel resonant feedback to the transistor.

4,988,960

FM DEMODULATION DEVICE AND FM MODULATION DEVICE EMPLOYING A CMOS SIGNAL DELAY DEVICE

Norio Tomisawa, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Division of Ser. No. 289,479, Dec. 21, 1988, which is a continuation of Ser. No. 760,332, Jul. 29, 1985, abandoned. This application Dec. 8, 1989, Ser. No. 447,781
Int. Cl.[5] H03C 3/09; H03D 3/06; H03K 3/354; H03L 7/099
U.S. Cl. 332—127 **6 Claims**



1. A pulse count detection circuit comprising:

(a) phase locked-loop means for producing a control signal including:

a ring oscillator circuit including a first CMOS gate circuit having an input terminal to which a binary input signal to be delayed is applied and an output terminal, a first power voltage control means for controlling an operation power voltage applied to the first CMOS gate circuit thereby to control an amount of delay of the first CMOS gate circuit and a feedback path for connecting said output of said first CMOS gate circuit back to said input of said first CMOS gate circuit;

reference signal generation means for generating a reference signal of constant frequency;

comparison means for comparing the phase of said reference signal to the phase of the output of said first CMOS gate circuit; and

control voltage generation means for generating a control signal in response to a result of the comparison of said comparator means and applying the generated control signal to control said first power voltage control means, thereby constituting a phase locked-loop so as to stabilize the frequency of the output of the ring oscillator circuit;

(b) a second CMOS gate circuit to which a signal to be pulse count detected is applied, the second CMOS gate circuit forming a delay circuit and comprising an even number of CMOS gates in series, wherein the second CMOS gate circuit includes second power voltage control means for controlling an operation power voltage applied to the second CMOS gate circuit thereby to control an amount of delay of the second CMOS gate circuit, and wherein said control signal generated by the phase locked-loop means is applied to the second voltage control means to set the delay of the second CMOS gate circuit;

(c) an exclusive OR gate having one input receiving an output from said second CMOS gate circuit and a second input receiving the signal to be pulse count detected; and

(d) a lowpass filter circuit for receiving the output of said exclusive OR gate and outputting a signal as the output of the pulse count detection circuit.

2. A frequency modulation circuit comprising:

(a) phase locked-loop means for producing a control signal, including:

a ring oscillator circuit including a first CMOS gate circuit having an input terminal to which a binary input signal to be delayed is applied and an output terminal, a first power voltage control means for controlling an operation power voltage applied to the first CMOS gate circuit thereby to control an amount of delay of the first CMOS gate circuit and a feedback path for connecting said output of said first CMOS gate circuit back to said input of said first CMOS gate circuit;

reference signal generation means for generating a reference signal of constant frequency;

comparison means for comparing the phase of said reference signal to the phase of the output of said first CMOS gate circuit; and

control voltage generation means for generating a control signal in response to a result of the comparison of said comparator means and applying the generated control signal to control said first power voltage control means of said first CMOS gate circuit, thereby constituting a phase locked-loop so as to stabilize the frequency of the output of the ring oscillator circuit;

(b) a second CMOS gate circuit comprising plural stages of CMOS gates in a loop, wherein the second CMOS gate circuit includes second power voltage control means for controlling an operation power voltage applied to the second CMOS gate circuit thereby to control an amount of delay of the second CMOS gate circuit, wherein said control signal generated by the phase locked-loop means is applied to the second voltage control means; and

(c) means for receiving a modulation input signal and applying a signal corresponding to the modulation input signal to the second control voltage means to modulate the operation power voltage applied to the second CMOS gate circuit, wherein a frequency modulated output is derived from a predetermined output of the CMOS gates.

4,988,961

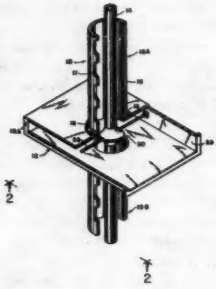
DEVICE FOR ACHIEVING MINIMAL REFLECTIONS IN ANTENNA COUPLING

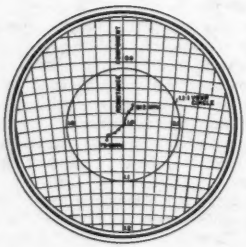
John L. Schadler, Lindenwold, N.J., assignor to General Signal Corporation, Stamford, Conn.

Filed Aug. 10, 1989, Ser. No. 392,223

Int. Cl.[5] H03H *5/000*; H01Q *1/050*

U.S. Cl. 333—26 **8 Claims**





1. In a T-junction of a coaxial transmission line to a waveguide transmission line, in which measured impedance values, over a range of approximately 30 MHz in a UHF band are to be held within a 1.1:1 circle of voltage standing wave ratio, the improvement which achieves minimal reflection over said range of frequencies comprising: a diconical slug, connected between an upper and lower portion of the coaxial transmission line and mounted for support within the structure of the waveguide transmission line, said diconical slug including back-to-back conical sections, such that large diameter ends of the conical sections confront each other.

4,988,962

CIRCUIT FOR CORRECTING GROUP DELAY AT MICROWAVE FREQUENCIES

Patrick Janer, Levallois-Perret, France, assignor to Alcatel Transmission Par Faisceaux Hertziens A.T.F.H., Perret Cedex, France

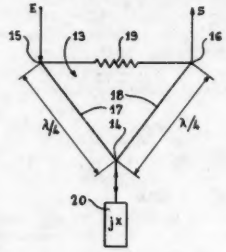
Filed Oct. 27, 1989, Ser. No. 427,397

Claims priority, application France, Oct. 27, 1988, 88 14027

Int. Cl.[5] H01P *1/32, 5/12*

U.S. Cl. 333—28 R **3 Claims**

1. A microwave frequency group delay corrector circuit comprising a complex impedance for performing group delay correction by reflection of the microwave on said complex impedance, a power divider comprising first, second and third ports, said first port normally functioning as an inlet port, said second and third ports being isolated from each other and normally functioning as outlet ports, said complex impedance being connected to said first port, said inlet microwave being applied to one said second and third ports and an outlet microwave being taken from the other of said second and third ports of the power divider, whereby the group delay corrector is easy to adjust, since it employs a single complex impedance and since the power divider is a passive component, imparts



very little residual group delay, thereby facilitating adjustment for a small delay, the amplitude transmission curve of the power divider is flat, and the corrector circuit is inexpensive and easy to integrate.

4,988,963

HIGH FREQUENCY COAXIAL LINE COUPLING DEVICE

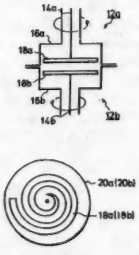
Toshiaki Shirosaka, Toyono, and Nobuyuki Ten, Takarazuka, both of Japan, assignors to DX Antenna Company, Limited, Hyogo, Japan

Filed Jan. 8, 1990, Ser. No. 461,755

Claims priority, application Japan, Feb. 23, 1989, 1-44841; Jul. 7, 1989, 1-176104

Int. Cl.[5] H01P *1/06*

U.S. Cl. 333—261 **5 Claims**



1. A high frequency coaxial line coupling device comprising a pair of coaxial lines each including a signal line and reference potential means surrounding said signal line, characterized in that each of said signal lines is provided with a spiral electrode element having its central end connected to the top end of said signal line and spreading on a plane normal to said signal line, a pair of said electrode elements are adapted to face concentrically each other at a predetermined interval and to enable relative rotation about a common axis of said signal lines, and the directions of the spirals of said electrode elements are mutually opposite as viewed from either side of said signal lines.

4,988,964

ELECTROMAGNETIC SWITCHGEAR

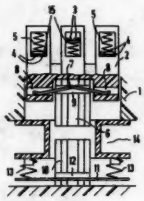
Georg Streich, Amberg; Günter Gnahn, Sulzbach-Rosenberg, and Kurt Held, Amberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 5, 1989, Ser. No. 403,689

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1988, 8811206

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—131 6 Claims



1. In electromagnetic switchgear comprising:
a housing;
a first magnet part including a yoke;
fixed contact parts;
a contact support movable in said housing;
movable contact parts held in said support and forming, with said fixed contact parts, opening and closing contacts;
a second magnet part including a movable armature;
means elastically connecting said contact support with said armature in such a way that with the opening contacts welded, an onward movement of the movable magnet part is possible without actuation of the closing contacts, the improvement comprising:
means suspending the yoke elastically in its closing direction, with said elastic suspension, the elastic connection between said armature and said contact support and the elasticity of the movable contact parts matched to one another in such a way that, with the opening contact welded and the magnet system closed, the spring excursions of said armature and said yoke are approximately the same.

4,988,965

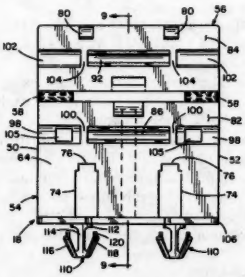
REED SWITCH HOLDER ASSEMBLY

Jesus Borja, Glenview, Ill., assignor to The Chamberlain Group, Inc., Elmhurst, Ill.

Filed Mar. 26, 1990, Ser. No. 499,000

Int. Cl.[5] H01H *9/00*

U.S. Cl. 335—205 11 Claims



1. A reed switch holder assembly for detecting the passage of a magnet adjacent the assembly and providing a switched output in response thereto, said assembly comprising:
a reed switch including an elongate insulative envelope in which are disposed first and second reeds, said switch further including a first lead electrically connected to said first reed and extending beyond one end of said envelope, and a second lead electrically connected to said second reed and extending beyond the other end of said envelope;
first and second metallic terminal elements each including a lead-receiving ferrule and a portion for mechanical and electrical connection to a conductor, said ferrule having a spring finger for holding a lead and including a finger portion extending transversely from the remainder of said ferrule, said spring finger being deflectable by a lead inserted into said ferrule; and
a reed switch holder having a first end and a second end and including:
a base of one-piece molded thermoplastic construction, and
a cover of one-piece molded thermoplastic construction, said base and cover comprising latch means for holding said base and cover assembled, said base and cover in their assembled condition defining a central cavity for holding said envelope and a pair of side cavities for receiving said leads and the lead-receiving ferrules of said terminal elements, one side cavity extending to said holder first end to permit insertion of the lead-receiving ferrule of said first terminal element into said one side cavity from said first end after said base and cover have been assembled holding said envelope in said central cavity, and the other side cavity extending to said holder second end to permit insertion of the lead-receiving ferrule of said second terminal element into said other side cavity from said second end after said base and cover have been assembled, said holder having a window extending transversely from at least one said side cavity for holding the finger portion of the corresponding ferrule and said holder including mounting means for mounting said assembly on a mounting wall, whereby after the base and cover are latched to hold the switch, the ferrule of the one terminal element can be inserted into said one side cavity so that its spring finger holds said one lead until the finger portion is received and held by the corresponding window.

4,988,966

ELECTROMAGNET, PARTICULARLY FOR ACTUATING THE SWITCHES OF A CONTACT MAKER APPARATUS

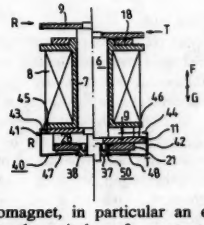
Alain Dumont, Pontoise, and Philippe Le Faou, Les Clayes Sous Bois, both of France, assignors to La Telemecanique Electrique, France

Filed Mar. 30, 1989, Ser. No. 330,543

Claims priority, application France, Mar. 31, 1988, 88 04263

Int. Cl.[5] H01F *7/13*

U.S. Cl. 335—273 11 Claims



1. An electromagnet, in particular an electromagnet intended to actuate the switches of a contact-maker apparatus, comprising:
a fixed yoke, a movable armature which is connected to these switches and which comprises a core concentric with an energization coil, as well as at least one magnetizable plate separated from the yoke by a variable longitudinal air-gap,
a return means which cooperates longitudinally with the armature for conferring thereon a rest position when the coil is de-energized, and

a concentric compensation spring disposed in an external region of the yoke opposite this air-gap, and whose forces antagonistic to this return means are only exerted over a fraction of the travel of the armature, wherein the said compensation device comprises a thin U shaped stirrup piece whose two parallel legs cooperate longitudinally with lateral ends of the plate, whereas portions of this stirrup placed between the legs and the center of the resiliently deformable cross-piece which connects them together cooperate longitudinally with inclined bosses or ramps of an adjustable rotary cam, placed concentrically with the core of the armature.

4,988,967

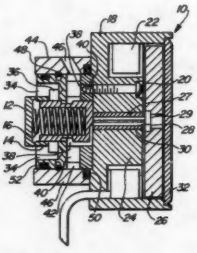
SOLENOID OPERATED HYDRAULIC CONTROL VALVE

Alan L. Miller, Ithaca, N.Y.; George H. Studtmann, Mount Prospect, Ill.; Todd L. King, Cedarburg, Wis.; Kenneth R. Gallaher, Algonquin; Jerome J. Zawada, Glendale Heights, both of Ill., and William P. Umlauf, Schererville, Ind., assignors to Borg-Warner Automotive Electronic & Mechanical Systems Corporation, Livonia, Mich.

Continuation-in-part of Ser. No. 237,498, Aug. 26, 1988, abandoned. This application Oct. 14, 1988, Ser. No. 262,152

Int. Cl.[5] F16K *31/06;* **H01F** *7/13*

U.S. Cl. 335—279 **22 Claims**



1. A solenoid operated actuator comprising:

a generally disc-shaped armature having freedom of motion along a central axis of said armature;

a stator having a central stator pole piece having a central hole passing therethrough that is substantially axially aligned with said central axis and a stator body having an open end surrounding said armature to provide a circumferential nonworking gap between said stator and the outer circumferential surface of said armature having a constant interstitial surface area and gap separation throughout the travel of said armature along said armature axis;

a solenoid coil wound around said central stator pole piece; and

a plunger attached to said armature and passing through said central hole of said central pole piece for maintaining axial alignment between said stator and said armature and transmitting the movement of said armature within said stator body through said central pole piece and out of said stator.

4,988,968

DOUBLE INSULATED TRANSFORMER AND BOBBIN CASE THEREOF

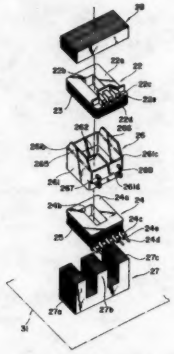
Yoshiro Tochio, Tokyo; Satoshi Saito, Nagano; Masaki Hiraide, Nagano; Hideo Konishi, Nagano; Hiroshi Kuwabara, Nagano, and Shiro Kokura, Osaka, all of Japan, assignors to Musashino Tuko Co., Ltd., Nagano, Japan

Filed Oct. 31, 1989, Ser. No. 429,229

Claims priority, application Japan, Nov. 1, 1988, 62-274545; May 25, 1989, 63-130272; May 25, 1989, 63-130273

Int. Cl.[5] H01F *27/02, 27/30*

U.S. Cl. 336—98 **9 Claims**



1. A transformer of the double-insulated type, comprising a bobbin case disposed therein, said bobbin case comprising an insulating member of tube-like shape, a partition wall disposed substantially normal to a longitudinal axis of the insulating member so that the inner space of said insulating member is divided into two recesses receiving primary and secondary winding assemblies from the opposite directions along the axis of said insulating member, and a pair of insulating rims projecting from the outer end surfaces of said insulating member at the side of said recess for receiving said primary winding assembly, said pair of insulating rims being formed such that they are capable of being bent inwardly along said outer end surfaces so as to obtain a creeping distance between a primary winding of said primary winding assembly and a core assembly of the transformer attached to said winding assemblies.

4,988,969

HIGHER CURRENT CARRYING CAPACITY 250V SUBMINIATURE FUSE

Leon Gurevich, St. Louis, Mo., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 23, 1990, Ser. No. 512,730

Int. Cl.[5] H01H *85/16, 85/14, 85/38*

U.S. Cl. 337—260 **28 Claims**

1. An electrical circuit protector comprising:

a first terminal and a second terminal each having a top portion and a bottom portion;

a first insulating means having two ends for electrically and thermally insulating said first terminal from said second terminal and for holding said first terminal and said second terminal apart from each other by a predetermined distance, said top portions of said first terminal and said second terminal being disposed intermediate the ends of said first insulating means.

a second insulating means;

a fusible conductor connected between said first terminal and said second terminal, supported on said first insulating means, and located between said first and second terminal means;

a third insulating means coating said fusible conductor be-

tween said first terminal and said second terminal, and between said first insulating means and said second insulating means; wherein

the combination of said first insulating means, said second insulating means, said fusible conductor, said third insulating means, and the portions of said first terminal and said second terminal define an assembly.

4,988,970

SEMICONDUCTOR FOR A RESISTIVE GAS SENSOR HAVING A HIGH RESPONSE SPEED

Edelbert Häfelé, Karlsruhe; Karl-Heinz Härdtl, Hagenbach; Andreas Müller, Heidelberg, and Ulrich Schönauer, Karlsruhe, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

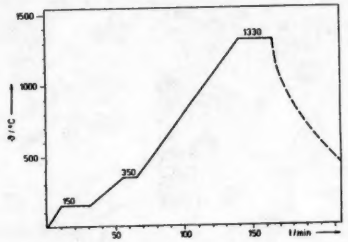
PCT No. PCT/DE88/00418, § 371 Date Sep. 28, 1989, § 102(e) Date Sep. 28, 1989, PCT Pub. No. WO89/00686, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 7, 1989, Ser. No. 423,445

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723051

Int. Cl.[5] H01C *7/00*

U.S. Cl. 338—34 **8 Claims**



1. Semiconductor for a resistive gas sensor having a high response speed for a determination of the partial pressure of oxygen and reducing gases, the semiconductor comprising a doped perovskite of the general composition $A'_{z1}A_{1-x-z1}B'_{4}B_{1-y-z2}O_3$, where A', A, B' and B are metal ions and the parameters z1 and z2 represent stoichiometry indices, characterized in that the value of x lies in a range from >0 to 0.05, the value of y in a range from >0 to 0.1 and the absolute values of z1 and z2 lie in a range between 0 and 0.002.

4,988,971

SUPERCONDUCTING TEMPERATURE CONTROLLER

Edward K. Anderson, III, Auburndale, Fla., assignor to Progress Technologies Corporation, St. Petersburg, Fla.

Filed Jan. 26, 1989, Ser. No. 301,430

Int. Cl.[5] H01L *43/00, 39/00*

U.S. Cl. 338—32 S **10 Claims**

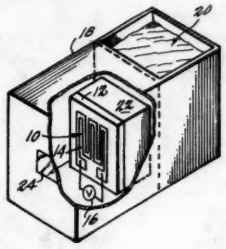
1. An apparatus for controlling temperature at a temperature above that of a heat sink comprising:

a substrate;

a superconducting thin film resistor made from a superconducting material having a superconducting transition temperature deposited on said substrate, said superconducting thin film resistor having a surface area that is temperature controlled;

means for transferring thermal energy from said heat sink to said substrate; and

means for applying a constant voltage across said thin film resistor to cause said thin film resistor to maintain a constant temperature that is within the superconducting transition temperature of said superconducting material.



4,988,972

METHOD FOR TRANSMITTING AND RECEIVING SIGNALS OVER TRANSMISSION POWER LINES

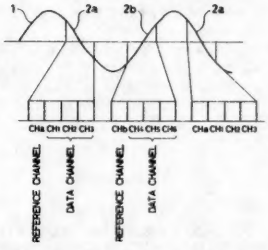
Masatoshi Takagi, Tokyo, Japan, assignor to Osaki Electric Co., Ltd., Tokyo, Japan

Filed Oct. 10, 1989, Ser. No. 419,550

Claims priority, application Japan, Oct. 18, 1988, 63-261980

Int. Cl.[5] H04M *11/04*

U.S. Cl. 340—310 A **5 Claims**



1. A method for sending and receiving reference and data signals on a AC voltage wave of a transmission line using sending and receiving means comprising the steps of:

forming a reference channel and data channels and setting the reference and data channels to each cycle of the AC voltage wave for transmission in both sending and receiving means,

superposing by means of the sending means, a reference transmission signal onto said reference channel and modulated data transmission signals onto said data channels in said sending means, and

receiving said reference transmission signal and data transmission signals in the receiving means by separation from the AC voltage wave for transmission, and comparing the amplitude and phase of the reference transmission signal received in the reference channel and amplitude and phase of the data transmission signals received in the data channels for monitoring the data transmission signals received in the data channels for monitoring the data transmission signals.

4,988,973

STEERING WHEEL

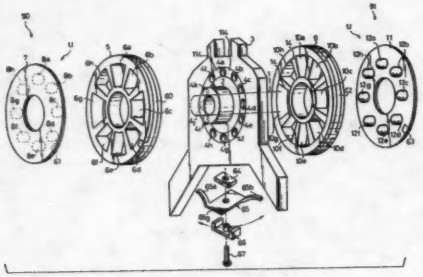
Shuji Inui; Chikahisa Hayashi; Makoto Kanai, and Toshinori Takahashi, all of Nishikasugai, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Aug. 19, 1988, Ser. No. 234,147

Claims priority, application Japan, Aug. 28, 1987, 62-216195; Apr. 30, 1988, 63-107973

Int. Cl.[5] B60Q *1/00*

U.S. Cl. 340—425.5 21 Claims



1. A steering wheel comprising:

a steering shaft;

a boss plate secured to the tip portion of said steering shaft;

a ring portion mounted to said boss plate;

light emitting means and light receiving means disposed oppositely to each other with said boss plate therebetween so as to perform light communication, said light emitting means having a plurality of light emitting units while said light receiving means having a plurality of light receiving units corresponding to said light emitting units of said light emitting means so as to transmit and receive light relative to each other, a pair of said light emitting units and said light receiving units transmitting and receiving the light relative to each other and constituting a communication unit; and

a plurality of through holes formed on said boss plate in correspondence to said light emitting means and said light receiving means, a number of said through holes being more than a number of said communication units for light communication, said through holes permitting to pass therethrough light signals for the light communication of all said units.

4,988,974

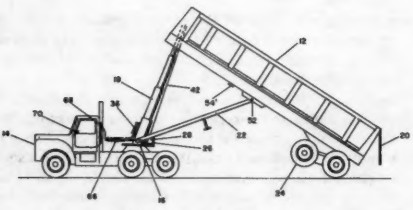
WARNING AND SAFETY SYSTEM INDICATING TRUCK TRAILER TIP-OVER CONDITION

Tommy J. Fury, 1613 Colonial Pkwy., Clovis, N. Mex. 88101, and Gerald D. Bailey, Rte. 1, Box 191, Farwell, Tex. 79325

Filed Jul. 17, 1989, Ser. No. 380,498

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—431 13 Claims



1. In a tractor-trailed truck, including a trailer capable of being raised by a hydraulic cylinder mounted between the front end of said trailer and the fifth wheel of said trailer, means for detecting the side-to-side or tip rotation of the front end of said trailer about the connection between said hydraulic cylinder and said fifth wheel, said detecting means including tip angle measuring means mounted adjacent to said fifth wheel, and means connecting said tip angle measuring means with one of said front end of said trailer or said hydraulic cylinder adjacent said front end of said trailer, said connecting means moving though substantially the same angle as said front end of said trailer, when said front end of said trailer undergoes tip rotation, to thereby proportionally rotate said tip angle measuring means.

4,988,975

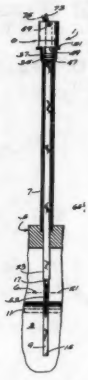
DIP STICK RESISTIVE LIQUID LEVEL DETECTOR WITH ADJUSTABLE STOP

Kimbel A. Nap, 6220 N. Sunnypoint Rd., Glendale, Wis. 53217

Filed Dec. 14, 1987, Ser. No. 133,148

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—450.3 8 Claims



2. An elongated liquid level detector for being inserted through the upper end of a dip stick tube of a reservoir for oil such as the crank case of an engine to facilitate determining the oil level in the reservoir, comprising:

an elongated flexible basically straight flat band of electrically nonconductive material having opposite wide surfaces and narrower edge surfaces, said band having a nominally upper first end and a nominally lower second end,

thin stripes of electrically conductive material bonded to each of said wide surfaces, respectively, and extending over a majority of the distance between said first and second ends and terminating short of said second end,

a window in said band proximate to where said conductive strips terminate,

means whose resistance varies with temperature disposed in said window, said means having terminals connected, respectively, to said strips of conductive material on opposite wide surfaces of said band,

an electrically nonconductive member into which said first end of said band and the strips of conductive material thereon extend, said first end being severable to determine the length of said band,

electric terminal elements for said detector retained in said member for contracting said conductive strips, respectively, and a sheath of insulating material encasing said band and conductive strips and extending from said nonconductive member to proximity with said lower ends of said conductive strips, and

a grommet formed over the insulative sheath adjacent said nonconductive member constituting a handle, the grom-

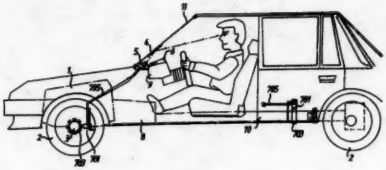
met being formed with a plurality of axially spaced flanges of different diameters, the flanges being separated and connected by cylinders of different diameters.

4,988,976

HEAD-UP DISPLAY WITH MAGNETIC FIELD SPEED DETECTING MEANS

Hsing-Tseng Lu, 3rd Fl., No. 14, Lane 96, Chinhsing Rd. Chinmei District, Taipei, Taiwan

Filed Sep. 6, 1989, Ser. No. 403,756
Int. Cl.[5] G02B *27/10*
U.S. Cl. 340—461 **9 Claims**



1. A vehicle head-up display for correctly displaying instant information values at an area visible to the driver in the central portion on the windshield of a vehicle, said display comprising:

an electromagnetic inducer for detecting the changes of magnetic field generated by a plurality of magnetic force generators so as to sense an electromagnetic signal;

the magnetic force generators secured on the wheel transmission shaft of the wheels for measuring the speed of the vehicle in conjunction with the sensing by the electromagnetic inducer;

a counting circuit device comprising microprocessor IC and an interface circuit, which receives the electromagnetic signal via a signal line so as to calculate the speed of the vehicle;

a projection display comprising a transmissive lens of a particular magnification, a fluorescent display lamp, a colored film having a transmissivity of only 70%, a dark colored transparent shield, a housing, a base, and an angle adjustment knob wherein the horizontal image displayed on the fluorescent display lamp is double-refracted by said transmissive lens and projected onto the windshield through said colored film and then reflected to form into the correct image;

a function control box connecting to said projection display via a control function line for transferring the control signal to said counting circuit device, said function control box having a control panel with touch control keys for setting the contents of the informations to be displayed; and

a light colored transparent displaying film having coated with hydrogel for displaying the image while preventing double images and the interference by the light rays coming from outside the vehicle.

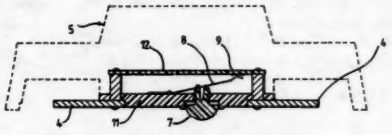
4,988,977

ADDRESS SETTING MEANS FOR FIRE DETECTORS

Roger D. Payne, Hordean, and Alan Capaldi-Tallon, Hayling Island, both of United Kingdom, assignors to Apollo Fire Detectors Limited, Great Britain

Filed Aug. 1, 1989, Ser. No. 388,165
Claims priority, application European Pat. Off., Sep. 5, 1988, 88308190; May 12, 1989, 89304823
Int. Cl.[5] G08B *25/00*
U.S. Cl. 340—524 **17 Claims**

14. An addressible fire detector assembly for receiving address coded signals from a central control, said assembly comprising a base and a sensor having means which enable them to be fitted together to form said assembly, said base also having mechanical means for defining a bar code, said sensor having



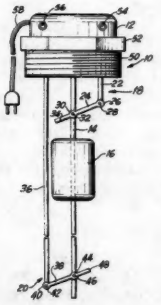
means for reading said bar code and for conditioning said sensor to receive said address coded signals.

4,988,978

LIQUID LEVEL INDICATOR FOR STORAGE TANKS

Wilson F. Soto, 50 Rockaway Pkwy., Brooklyn, N.Y. 11212

Filed Apr. 2, 1990, Ser. No. 503,256
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—624 **18 Claims**



1. A liquid level indicator for storage tanks to indicate when the storage tank is substantially filled with a liquid and when the storage tank is near empty, said indicator comprising:

a cover member for covering an opening in a top portion of the storage tank, said cover member including a housing;

signal means for indicating when the storage tank is substantially filled with the liquid and when the storage tank is near empty;

switch means disposed within said housing of said cover member for activating said signal means;

a central rod extending downwardly from said cover member into the storage tank, said central rod being secured to said cover member in a fixed non-movable relationship therebetween;

vertically movable first rod means extending from said housing of said cover member into the storage tank on one side of said central rod for activating said switch means when the storage tank is substantially filled with the liquid;

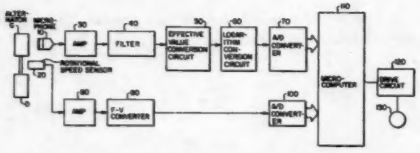
vertically movable second rod means extending from said housing of said cover member into the storage tank on an opposite side of said central rod for activating said switch means when the storage tank is near empty; and

a float movably disposed on said central rod for floating on the liquid so that said float moves vertically along said central rod in response to level of the liquid, said float contacting and moving said first rod means when the storage tank is substantially filled with the liquid, and said float contacting and moving said second rod means when the storage tank is near empty.

4,988,979
FAULT INSPECTION SYSTEM FOR ROTARY MACHINES

Hiroaki Sasaki, Nagoya; Yukio Fukuda, and Toshio Shimizu, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Sep. 8, 1989, Ser. No. 404,736
Claims priority, application Japan, May 13, 1989, 1-119164
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—683 **8 Claims**



1. A fault inspection system for rotary machines, comprising:

first detection means for detecting as a first detection signal a selected one of the rotational speed and a physical quantity related thereto of a rotary machine driven in such a manner as to change the rotational speed thereof;

second detection means for detecting as a second detection signal a selected one of the sound pressure and mechanical vibrations generated from the rotary machine as it is driven;

first determining means for determining a reference line representing a relationship with the passage of time between values of the first and second detection signals;

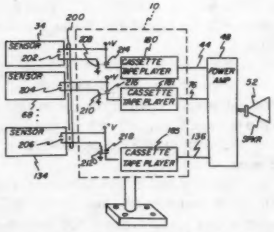
second determining means for determining a third detection signal related to the area corresponding to a region where the instantaneous value of the second detection signal exceeds the reference line; and

decision means for determining that the rotary machine is faulty when the third detection signal is not within a predetermined value.

4,988,980
LOW COST VERBAL ANNUNCIATOR

Randall C. Graham, Nashville, Tenn. 37206, assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Oct. 18, 1985, Ser. No. 788,990
Int. Cl.[5] G08B *25/08*; G11B *5/00*; H01H *47/00*
U.S. Cl. 340—692 **7 Claims**



1. An alarm channel for a multichannel verbal annunciator having amplifier and speaker means responsive to verbal message signals for announcing verbal messages, the alarm channel responsive to an external sensor **(34)**, having a contact **(202)** responsive to a voltage **(252)** for providing the voltage to the alarm channel in response to a sensed condition, the alarm channel comprising:

a normally open momentary close switch **(250)**, responsive to the voltage **(252)** for momentarily closing in response to external actuation thereby momentarily providing the voltage to

a first relay **(254)**, responsive to said momentary voltage provided by said momentary contact switch for closing an associated contact **(258)** also responsive to the voltage **(252)**, for providing the voltage to said first relay **(254)** for keeping said first relay energized after said momentary switch is re-opened after external actuation and for providing the voltage to

a second relay **(256)**, responsive to the voltage provided by said first relay contact **(258)** for closing an associated contact **(260)** responsive to the voltage provided by the external sensor for providing the voltage to

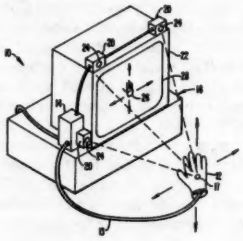
a third relay **(266)**, responsive to the voltage provided by said second relay contact **(260)** for closing an associated contact **(268)** responsive to the voltage provided by the first relay contact **(258)** for providing the voltage to

a cassette tape player for providing a verbal message signal to the amplifier and speaker in response to the voltage provided by the third relay contact **(268)**.

4,988,981
COMPUTER DATA ENTRY AND MANIPULATION APPARATUS AND METHOD

Thomas G. Zimmerman, San Francisco, and Jaron Z. Lanier, Palo Alto, both of Calif., assignors to VPL Research, Inc., Redwood City, Calif.

Continuation of Ser. No. 26,930, Mar. 17, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,107
Int. Cl.[5] G09G *3/02*
U.S. Cl. 340—709 **66 Claims**



1. Apparatus for interacting with a computer program comprising:

display means connected to the computer for displaying objects on a screen;

glove means adapted to be worn on a hand of a user, the glove means including gesture sensing means coupled to the glove means for detecting flexure of fingers of the user's hand, and position sensing means coupled to the glove means for detecting a position of the hand with respect to the display means;

interface means for coupling the glove means to the computer; and

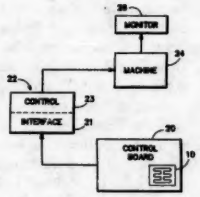
control means for controlling a cursor indicated on the display means in response to and emulating the flexure of fingers and the position of the hand, the cursor being capable of interactivity acting upon a virtual object represented within the computer to allow communication and interaction between the user and the program.

4,988,982

TOUCH PAD MACHINE CONTROL

Bruce L. Rayner, Nevada City, and Peter N. Johnson, Grass Valley, both of Calif., assignors to The Grass Valley Group, Inc., Nevada City, Calif.

Continuation of Ser. No. 30,778, Mar. 25, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,888
Int. Cl.[5] G09G 5/00
U.S. Cl. 340—706 14 Claims



1. A method of controlling a device with a touch pad comprising the steps of:

converting the movement of a pointer over a first region of the surface of the touch pad into a plurality of data points;

determining from the data points data parameters, the data parameters including the rate of movement of the pointer along an axis and release of the pointer; and

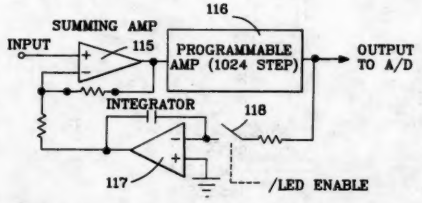
generating a velocity control signal for the device as a function of the data parameters to vary the movement of the device wherein the rate of movement of the pointer in contact with the touch pad corresponds directly to the velocity of the device being controlled, release of the pointer from contact results in control of the device at a constant velocity defined as the last previous velocity of the device prior to release of the pointer from the touch pad, and zero velocity of the pointer in contact with the touch pad corresponds to deceleration of the device to be controlled.

4,988,983

TOUCH ENTRY SYSTEM WITH AMBIENT COMPENSATION AND PROGRAMMABLE AMPLIFICATION

Wayne J. Wehrer, Austin, Tex., assignor to Carroll Touch, Incorporated, Round Rock, Tex.

Filed Sep. 2, 1988, Ser. No. 240,168
Int. Cl.[5] G06K 11/06; H03K 17/94
U.S. Cl. 340—712 13 Claims



1. A touch input device for use with a visual display, comprising:

a plurality of paris of light emitters and light detectors forming light beams spanning the visual display;

means for intermittently activating corresponding emitters and detectors forming individual light beams; and

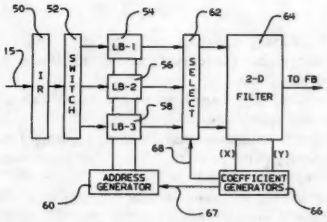
means for detecting the interruption of individual light beams, further comprising a feedback loop containing a programmable amplifier, a summing amplifier and an integrator, the programmable amplifier having a unique amplification ratio for each detector and being sequentially responsive to signals detected by each detector during a time interval greater than the time during which the corresponding emitter is activated, output from the programmable amplifier establishing a constant reference level independent of signals output by an activated detector, during a portion of the time interval during which the corresponding emitter is inactive, the signal induced in each detector from the corresponding emitter resulting in an output level from the programmable amplifier exceeding the reference level, so that signals induced by each light beam can be distinguished from signals due to ambient conditions and the variability of the components of the touch input device.

4,988,984

IMAGE INTERPOLATOR FOR AN IMAGE DISPLAY SYSTEM

Jorge Gonzalez-Lopez, Red Hook, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,922
Int. Cl.[5] G09G 1/00
U.S. Cl. 340—728 10 Claims



1. An interpolator for an image display system comprising:

first means for storing an image to be interpolated, said image comprising a plurality of picture elements organized in two dimensions;

second means for transferring said image into a plurality of line buffers such that each line buffer contains one pixel from said image for each pixel position in a first dimension and consecutive line buffers contain pixels across a second dimension;

coefficient incrementing means for generating interpolation coefficients for interpolation;

coefficient error correction means for accumulating an error term and for correcting the generated coefficient in response to the sign of said accumulated error term;

filter means for generating interpolated image values based on the contents of said line buffers and in response to said coefficient incrementing means;

selection means for consecutively connecting two of said plurality of line buffers to said filter means; and

frame buffer means for storing the output of said filter means.

4,988,985

METHOD AND APPARATUS FOR A SELF-CLEARING COPY MODE IN A FRAME-BUFFER MEMORY

Anthony C. Barkans, Woburn, and Jorge Lach, Arlington, both of Mass., assignors to Schlumberger Technology Corporation, Houston, Tex.

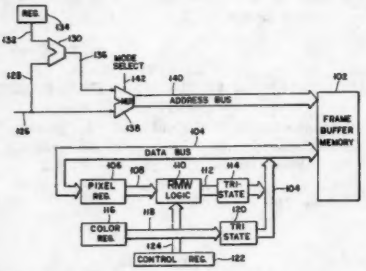
Continuation of Ser. No. 8,868, Jan. 30, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,877
Int. Cl.[5] G09G 5/30
U.S. Cl. 340—750 4 Claims

1. A method of operating a frame-buffer memory for refreshing an image on a raster-scanned display device, said memory comprising a plurality of identically organized planes, a first one of said plurality of planes being operable as an independent

drawing plane, a remainder of said plurality of planes being operable to refresh said display, each of said planes operable for refreshing said display storing one bit of data representing each pixel of said image at a relative position, said drawing plane storing one bit of data associated with each pixel at said relative position, the method comprising:

(a) drawing an image in a first one of said memory planes;

(b) reading said image from said first memory plane to a temporary storage means;



(c) selectively enabling memory planes other than said first memory plane for receiving said image for receiving said image;

(d) writing said image from said temporary storage means to said enabled memory planes;

(e) simultaneous with step d writing a constant to said first memory plane to thereby erase the image stored in said first memory plane; and

(f) refreshing said raster-scanned display device from said enabled memory planes other than said first memory plane.

4,988,986

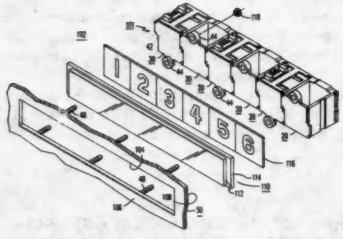
DISPLAY MODULE AND MULTIPLE UNIT DISPLAY CONSTRUCTED OF SUCH DISPLAY MODULES

Adolf H. Martin, Glenview, Ill., assignor to Inventio AG, Hergiswil, Switzerland

Filed Dec. 22, 1988, Ser. No. 288,195

Int. Cl.[5] G08B *5/00, 5/36*

U.S. Cl. 340—815.01 **10 Claims**



1. A display module which may be assembled and interlocked with like modules to provide a multiple unit display having either a single or a double row of modules, comprising:

a housing having first and second spaced parallel sides, a third side interconnecting said first and second sides, a front portion defining a translucent face member for illuminating indicia, and a rear portion defining an opening having an axis normal to the translucent face member,

said housing defining a central cavity having an open end cooperatively defined by predetermined edges of said first and second sides, and said front and rear portions,

lamp contacts disposed in the opening of said rear portion to define a lamp socket,

first and second electrical terminals carried by the rear portion which are adapted to energize said lamp contacts,

a lamp module removably disposed in said lamp socket,

said lamp module including a lamp which projects into the cavity,

said first and second sides each having male and female dovetail extrusions located such that the male and female extrusions on said first side are in 180 degree rotational symmetry with the male and female extrusions on said second side, enabling male and female extrusions of a module to respectively cooperate with female and male extrusions of an adjacent module, regardless of whether the open end of the cavity of the module faces in the same direction as the open end of a cavity of an adjacent module, or in the opposite direction,

and a single mounting projection integral with said housing defining a stud receiving opening having an axis parallel with the axis of the opening defined by said rear portion, with said mounting projection extending integrally outward from the front via the edge which cooperatively defines the open end of the cavity.

4,988,987

KEYSAFE SYSTEM WITH TIMER/CALENDAR FEATURES

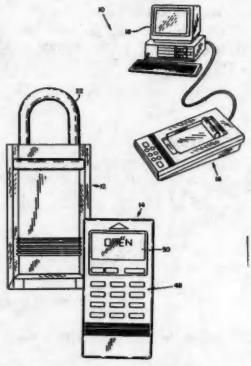
Philip D. Barrett; Walter G. Henderson, and Wayne F. Larson, all of Salem, Oreg., assignors to Supra Products, Inc., Salem, Oreg.

Continuation-in-part of Ser. No. 192,853, May 11, 1988, abandoned, which is a division of Ser. No. 15,864, Feb. 17, 1987, Pat. No. 4,766,746, which is a continuation of Ser. No. 831,601, Feb. 21, 1986, Pat. No. 4,727,368, which is a continuation-in-part of Ser. No. 814,364, Dec. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 788,072, Oct. 16, 1985, abandoned. This application Jan. 27, 1989, Ser. No. 303,711

The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.

Int. Cl.[5] E05B *49/00*

U.S. Cl. 340—825.31 **16 Claims**



1. An electronic lock system including a lock and an electronic key, the lock comprising:

means for restricting access to a secure area associated therewith;

communication means for relaying data between the lock and the electronic key;

memory means for containing a lock access code; and

control means for controlling operation of the lock;

the electronic key comprising:

memory means for containing a key access code and an expiration date code; and

communication means for relaying data between the electronic key and the lock;

the system further including:

calendar means for providing calendar data indicative of the date;

logic means for comparing the calendar data from the calendar means with the expiration date from the electronic key memory means to determine whether the key is expired; and

means for allowing access to the secure area associated with the lock upon correspondence between the key and lock access codes only if it is determined that the key is not expired.

4,988,988

CENTRAL MONITORING AND ALARMING SYSTEM

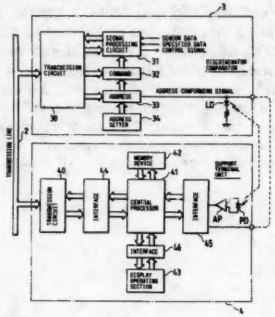
Tetsuo Kimura, Tokyo, Japan, assignor to Nittan Company Ltd., Japan

Filed Oct. 3, 1989, Ser. No. 416,838

Claims priority, application Japan, Oct. 20, 1988, 63-262777

Int. Cl.[5] G05B *23/02*; H04M *11/04*

U.S. Cl. 340—825.06 **7 Claims**



1. A central monitoring and alarming system comprising:

a central monitoring station having a memory device for storing various kinds of data, said central monitoring station having an attribute data table, said central monitoring station detecting an occurrence of an abnormal condition at places monitored by said system to produce a controlling signal to control equipment for preventing disaster from expanding;

a transmission line extending from said central monitoring station to said places;

a plurality of terminal units having sensors for detecting said abnormal condition and address setting means for setting an address being assigned to each of said plurality of terminal units, said each of said plurality of terminal units being connected to said transmission line to transmit information detected by said sensors to said central monitoring station in response to an addressing signal outputted from said central monitoring station, said each of said plurality of terminal units operating an address conformity signal corresponding to a condition when an address code in said addressing signal coincides with said assigned address; and

a supporting terminal unit for receiving said controlling signal and said addressing signal from said central monitoring station, said supporting terminal unit discriminating the assigned address from said addressing signal, said supporting terminal unit transmitting said assigned address and an attribute data to said central monitoring station to modify said attribute data table after said address conformity signal is received.

4,988,989

MASTER-SLAVE COMMUNICATION SYSTEM FOR STATIONS HAVING TIMER MEANS

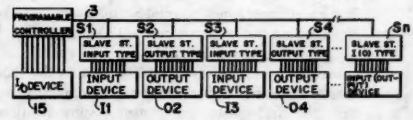
Tadaomi Goto, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 25, 1988, Ser. No. 261,937

Claims priority, application Japan, Oct. 26, 1987, 62-271035

Int. Cl.[5] H04B *3/00*

U.S. Cl. 340—825.21 **17 Claims**



1. A data transmission and receiving communication system for communicating data between a main station and each of a plurality of peripheral stations during an identifiable period of time, said system comprising:

a main station including a first timer device for sequentially identifying each of the plurality of peripheral stations with which said main station is communicating data;

a plurality of peripheral stations, each including a second timer device, each being connected to said main station through a common communication line, each said second timer device for initiating data communication between said main station and each corresponding peripheral station every communication unit period, with the order of the communications between the main station and each of the peripheral stations being predetermined and a data communication between the main station and each of the peripheral stations occurring during sequential intervals of said communication unit period, each interval of equivalent time duration;

and wherein, upon each said second timer means counting a designated period of time, determining on the basis of the predetermined communication order of each of the peripheral stations and said equivalent time duration of each interval of said communication unit period, initiating the data communication between the main station and each of the peripheral stations, and

said main station identifying the peripheral station under communication of data by a sequential time counted by the first timer device.

4,988,990

DUAL MASTER IMPLIED TOKEN COMMUNICATION SYSTEM

Jogesh Warrior, Shoreview, Minn., assignor to Rosemount Inc., Eden Prairie, Minn.

Continuation of Ser. No. 349,913, May 9, 1989, abandoned, which is a continuation of Ser. No. 84,398, Aug. 11, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 456,047

Int. Cl.[5] H04Q *9/00*; G08B *21/00*

U.S. Cl. 340—25.5 **7 Claims**

1. A method in a communication system in which only first and second master units send messages to and receive messages from at least one slave unit having a unique slave unit address over a common communications link, comprising:

for the first master unit:

sending an initial message comprising the steps of:

waiting for a clear channel on the communication link;

setting a link quiet timer;

enabling transmission of the initial message to the slave unit if a message from the slave unit to the second master unit is detected on the communication link;

enabling transmission of the initial message if the link quiet timer times out and no transmissions have been detected on the communication link; and

setting a link grant timer;

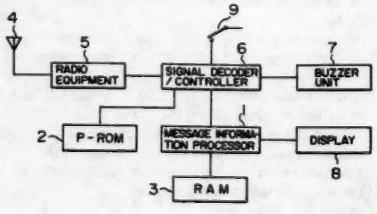
sending subsequent messages comprising the steps of:
enabling transmission of a subsequent message to the slave unit if the link grant timer times out and no messages from the second master unit have been detected on the communication link;
setting the link quiet timer if a message from the second master unit is detected on the communication link and:
enabling transmission of the subsequent message if a message from the slave unit to the second master unit is detected on the communication link;
enabling transmission of the subsequent message if the link quiet timer times out and no messages have been detected on the communication link;
setting the quiet timer and repeating the steps of sending subsequent messages; whereby as long as the second master unit does not transmit on the communication link, the first master nit transmits subsequent messages with only a delay of waiting for the link grant timer to time out; for the second master;
sending an initial message comprising the steps of:
waiting for a clear channel on the communication link;
setting a link quiet timer;
enabling transmission of the initial message to the slave unit if a message from the slave unit to the first master unit is detected on the communication link;
enabling transmission of the initial message if the link quiet timer times out and no transmissions have been detected on the communication link; and setting a link grant timer;
sending subsequent messages comprising the steps of:
enabling transmission of a subsequent message to the slave unit if the link grant timer times out and no messages from the first master unit have been detected on the communication link;
setting the link quiet timer if a message from the first master unit is detected on the communication link and:
enabling transmission of the subsequent message if a message from the slave unit to the first master unit is detected on the communication link;
enabling transmission of the subsequent message if the link quiet timer times out and no messages have been detected on the communication link;
setting the quiet timer and repeating the steps of sending subsequent messages; whereby as long as the first master unit does not transmit on the communication link, the second master unit transmits subsequent messages with only a delay of waiting for the link grant timer to time out.

4,988,991

SELECTIVE CALL RECEIVING APPARATUS

Takamasa Motegi, Yokohama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 23, 1987, Ser. No. 100,314
Claims priority, application Japan, Sep. 26, 1986, 61-229004
Int. Cl.[5] H04Q *5/00*; H04M *11/00*
U.S. Cl. 340—825.5 **14 Claims**



1. A selective call receiving apparatus comprising:
receiving means for receiving incoming messages for each of at least two different selective calling numbers;
first memory means for storing incoming messages received from said receiving means for each of said at least two different selective calling numbers, said first storing means having a capacity for storing a predetermined number of messages;
second memory means for storing data representing an erasing priority for erasing a message of lower priority stored in said first memory means as compared to other messages stored in said first memory means when a new incoming message is received by said receiving means and is to be stored in said first memory means when said first memory means is at its full storage capacity;
erasure means for erasing, in accordance with the erasing priority data stored in said second memory means, a lower priority message stored in said first memory means when a new incoming message is received by said receiving means and is to be stored in said first memory means and said first memory means is at its full storage capacity, said erasure means including:
first means defining a priority ranking for said at least two selective calling numbers and erasing a stored message for one of said at least two selective calling numbers of the lowest priority in said ranking;
said first means of said erasure means selectively operating under control of said stored erasing priority data, wherein said erasure means further includes third means for comparing the number of messages stored in said memory means for each of said at least two selective calling numbers with one another and erasing a message for that selective calling number having the greatest number of messages stored in said first memory means, said third means of said erasure means selectively operating under control of said stored erasing priority data.

4,988,992

SYSTEM FOR ESTABLISHING A CODE AND CONTROLLING OPERATION OF EQUIPMENT

Carl T. Heitschel, Downers Grove, and Paul W. Reich, Glendale Heights, both of Ill., assignors to The Chamberlain Group, Inc., Elmhurst, Conn.

Filed Jul. 27, 1989, Ser. No. 386,367
Int. Cl.[5] H04B *7/00, 10/00*
U.S. Cl. 340—825.69 **3 Claims**

1. A system for establishing codes and controlling operation of at least two pieces of equipment, such as a garage door operating mechanism and a security device, by transmitting radio frequency signals carrying said codes, said system comprising:
a first transceiver;

a second transceiver substantially identical to said first transceiver, each said transceiver comprising:

means for randomly generating codes,

means for receiving a radio frequency signal carrying a code,

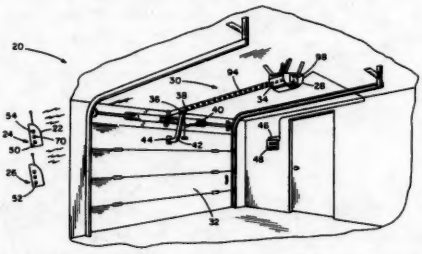
memory means having a first location for storage of a first code and a second location for storage of a second code,

means for selecting one of said locations for storage of a code,

means for selecting whether the code is to be stored in the selected location is a code from said means for randomly generating codes or is a code from said means for receiving, the last-mentioned means for selecting including means for disabling said means for randomly generating codes in response to reception of a radio frequency signal carrying a code, and

means for transmitting a radio frequency signal carrying the first code and for transmitting a radio frequency signal carrying the second code, said system further comprising:

a first receiver for positioning remote from said transceivers and for connection to one of said pieces of equipment which is a garage door operating mechanism; and



a second receiver for positioning remote from said transceivers and for connection to the other of said pieces of equipment, each said receiver comprising:

means for receiving radio frequency signals transmitted by said transceivers,

memory means storing the code of only one memory location of said first transceiver, the memory means of the other receiver storing the code of the other memory location of said first transceiver,

means for comparing a code carried by a radio frequency signal with the code stored in the last-mentioned memory means, and

means responsive to the means for comparing to cause actuation of the corresponding piece of equipment whereby the codes of the memory locations of the transceivers can be identical with either transceiver establishing the codes, either transceiver can actuate either piece of equipment, and in the event of loss of the first transceiver, the second transceiver can be used to program into the memory locations of a third transceiver the codes randomly generated by the first transceiver so that there is no need to change the codes stored in the memories of the receivers.

4,988,993

REARRANGEABLE MULTICONNECTION SWITCHING NETWORKS CONSTRUCTED USING COMBINATORIAL DESIGNS

Frank K. Hwang, Warren, N.J., and Gaylord W. Richards, Naperville, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 946,431, Dec. 23, 1986, Pat. No. 4,887,079. This application Jul. 19, 1989, Ser. No. 382,511

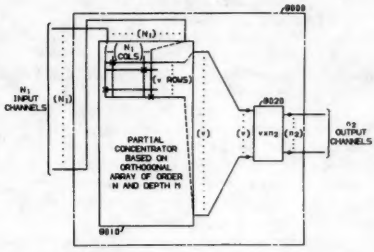
Int. Cl.[5] H04Q *1/00*; H04B *13/02*

U.S. Cl. 340—825.800 **5 Claims**

1. A switching network for selectively connecting N_1 input channels to n_2 output channels such that none of said n_2 output channels is connected to more than one of said N_1 input channels at any time, N_1 and n_2 being positive integers each greater than one, n_2 being at most equal to N_1, *said switching network comprising*

a partial concentrator having N_1 columns each connected to a different one of said N_1 input channels, and v rows, said partial concentrator comprising means for selectively connecting ones of said columns to ones of said rows, v being a positive integer at least equal to n_2, and

a switch having n_2 outlets each connected to a different one of said output channels and v inlets each connected to a different one of said rows, said switch comprising means for selectively connecting said outlets to said inlets,



said partial concentrator being derivable from a row-wise merging of w copies of a partial concentrator, each of said copies having N^2 columns and M sets of N rows, where, for any integer i, $O \leqq i \leqq N-N-1$, and any integer j, $O \leqq j \leqq M-1$, row i of set j of said each copy is incident to columns of said each copy corresponding to columns of an orthogonal array of order N and depth M which, in row j of said array, contain symbols defining row i, where a row is said to be incident to a column if there is a cross-point at the intersection, where M, N and w are positive integers each greater than one, where wN^2 is at least equal to N_1, and where MN is at least equal to v.

4,988,994

TRAFFIC MONITORING DEVICE

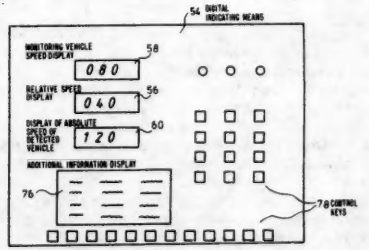
Hans-Gerd Loeven, Duisburg, Fed. Rep. of Germany, assignor to Robot Foto Und Electronic GmbH U. Co. Kg, Dusseldorf, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,083

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 3728401

Int. Cl.[5] G08G *1/01*

U.S. Cl. 340—936 **13 Claims**



1. A traffic monitoring device particularly for use with a moving monitoring vehicle, comprising

a measuring instrument for measuring the relative speed of a vehicle to be detected with respect to the speed of the monitoring vehicle,

a speed measuring means for measuring the speed of the monitoring vehicle,

signal evaluation means to which

a relative speed signal from said measuring instrument indicative of the relative speed of the vehicle to be detected,

the monitoring vehicle speed signal from the speed measuring means,

an adjustable limit speed signal,

a minimum relative speed signal, and

a minimum monitoring vehicle speed signal

are applied, and which comprises

means for comparing the speed of the vehicle to be detected with said limit speed, said comparison using said relative speed signal and taking into account said monitoring vehicle speed signal,

means for comparing said monitoring vehicle speed signal with said minimum monitoring vehicle speed signal,

means for comparing said relative speed signal with said minimum relative speed signal, and

means for providing a releasing signal,

if said comparison indicates exceeding of said limit speed by said vehicle to be detected, and

provided said monitoring vehicle speed signal exceeds said minimum monitoring vehicle speed signal, and

further provided said relative speed signal exceeds said minimum relative speed signal, and

a photographic camera for photographing the vehicle to be detected, and releasing means triggered by said releasing signal for automatically releasing said photographic camera.

4,988,995

DISPLAY DEVICE WITH MULTIPLE RETRACTABLE FLAT SCREENS

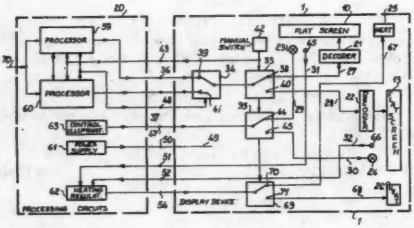
Jean-Michel Buisson, Colombes, and Jean-Marie Soubrier, Gentilly, both of France, assignors to Thomson CSF, Paris, France

Filed Jun. 7, 1988, Ser. No. 203,159

Claims priority, application France, Jun. 12, 1987, 87 08188

Int. Cl.[5] G01C *21/00*

U.S. Cl. 340—971 **6 Claims**



1. A device for displaying information to an operator of an aircraft, said information contained in digital display signals output from an external processor, comprising:

a parallelepipedic shaped case having four sides;

means for fixing and pivotally mounting said case to present one of two display sides of said case to said operator;

first electronic display means for displaying a first plurality of aircraft information on said first display side of said case;

second electronic display means for displaying said first plurality of information and a second plurality of information on said second display side of said case;

means for inputting said digital display signals from said external processor; and

means for switching said input digital display signals to one of said first electronic display means and second electronic display means, said switching means also outputting a switching signal to said external processor so that digital display signals corresponding to one of said first plurality of information and said combined first and second plurality of information are output by said processor, depending on the position of said switching means.

4,988,996

DISPLAY SYSTEM

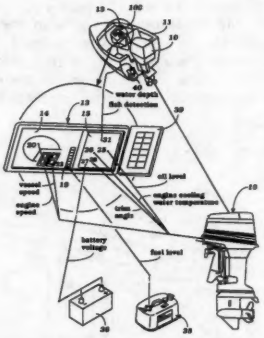
Saburo Ito, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 2, 1989, Ser. No. 388,684

Claims priority, application Japan, Aug. 2, 1988, 63-192086

Int. Cl.[5] G08B *23/00*

U.S. Cl. 340—984 **19 Claims**



1. In a marine vessel having an outboard drive unit including propelling means for propelling said vessel through the water, the improvement comprising a display system, including various means for detecting various operating and navigating conditions of said vessel, means for detecting fish, and a single displaying device comprised of a variable display having first and second alternate displays of information each for displaying information regarding at least one of the detected various operating and navigating conditions, said variable display further having a warning display which automatically displays warning information regarding at least one of said various operating and navigating conditions when that particular condition is detected to be outside of a predetermined range for that particular condition regardless of which of said alternate displays is being displayed.

4,988,997

METHOD FOR CHARACTER CODE GENERATION

Eric S. Prame, Lidingo, Sweden, assignor to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 167,205, Mar. 11, 1988, abandoned. This application Jan. 25, 1990, Ser. No. 481,643

Claims priority, application Sweden, Apr. 7, 1987, 8701445

Int. Cl.[5] H03M *11/00*

U.S. Cl. 341—25 **4 Claims**

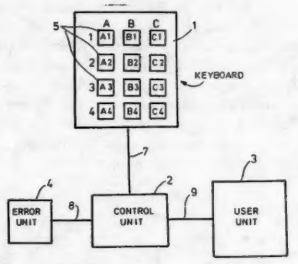
1. A method for the detection of erroneous keystrokes in a data entry system having a keyboard, control unit and an error unit wherein each character in a stream of input characters is generated by pairs of two sequential keystrokes, said method comprising the steps of:

striking a first key and then a second key in sequence without overlapping said keystrokes, said striking of keys being characterized in that the position of the second key in relation to the first key of said sequence is sensed by the control unit;

decoding said keystroke sequence according to a pre-established rule stating that the second key of each keystroke pair is always displaced from the position of the first key

in said keystroke pair in the same predefined direction in order for the combination to be decoded as valid;

generating the character corresponding to each keystroke pair decoded as valid; and



generating an error signal for each keystroke pair decoded as invalid immediately following said decoding and restoring synchronism to the remaining characters in said stream of input characters.

4,988,998

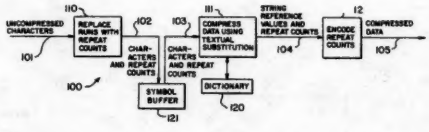
DATA COMPRESSION SYSTEM FOR SUCCESSIVELY APPLYING AT LEAST TWO DATA COMPRESSION METHODS TO AN INPUT DATA STREAM

John T. O'Brien, Louisville, Colo., assignor to Storage Technology Corporation, Louisville, Colo.

Filed Sep. 5, 1989, Ser. No. 403,084

Int. Cl.[5] H03M *7/30, 7/46*

U.S. Cl. 341—55 **21 Claims**



1. A method of compressing an input character stream comprising the steps of:

replacing a sequential repetition of a single character in said input character stream with said character and a repeat count indicative of the number of sequential repetitions of said character in said input character stream to form a once compressed character stream; and

encoding said once compressed character stream using textual substitution.

4,988,999

DIGITAL MODULATION METHOD

Toshihiro Uehara; Hotaka Minaguchi, and Yoshinobu Oba, all of Tokyo, Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Filed Apr. 9, 1990, Ser. No. 506,270

Claims priority, application Japan, Apr. 12, 1989, 1-90537; Feb. 9, 1990, 1-28262

Int. Cl.[5] H03M *7/00*

U.S. Cl. 341—59 **8 Claims**

1. A digital modulation method for converting 8-bit digital data into 14-bit digital modulation codes, said digital modulation method comprising:

step 1 for selecting up to four 14-bit digital modulation codes for each 8-bit digital data, said 14-bit digital modulation code is selected by the procedures of

(a) selecting among the 2^{14} 14-bit digital codes, a digital code the numbers of consecutive identical bits in which are 5 or less in the first 6 bits, 2–7 from the second bit to 13th bit, and 6 or less in the last 7 bits, the absolute value of CDS (code word digital sum) of the selected digital code being 4 or less, and repeating this selecting procedure,

(b) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is 0, and pairing the selected 14-bit digital code with the reversal code thereof to make the 2 digital codes one group, or selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, combining the selected 14-bit digital codes with the reversal codes thereof, and further combining the two 14-bit digital codes with a pair of 14-bit digital codes selected at the above procedure to make the 4 digital codes one group, and repeating this selecting procedure,

(c) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +2, and another digital code the first bit of which is "1", and the value of CDS of which is +2 or +4, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure,

(d) selecting among the selected 14-bit digital codes at the procedure (a), a digital code the first bit of which is "0", and the value of CDS of which is +4, and another digital code the first bit of which is "1", and the value of CDS of which is +2, and combining the two selected 14-bit digital codes with the reversal codes thereof to make the 4 digital codes one group, and repeating this selecting procedure, and

(e) selecting 256 groups among the groups formed in the above procedures as the 14-bit digital modulation codes;

step 2 for selecting one group of 14-bit digital modulation codes among the 256 groups of the 14-bit digital modulation codes, the selected group corresponding to inputted 8-bit digital data;

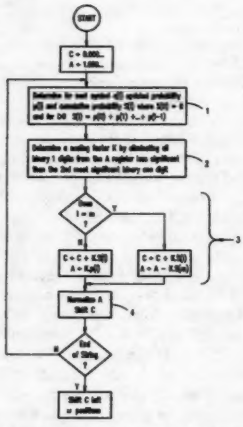
step 3 for further selecting one or more 14-bit digital modulation codes in the selected group at step 2, each of the 14-bit digital modulation codes satisfying the requirement that the number of consecutive identical bits at the joint portion of the proceding 14-bit digital modulation code already selected and the 14-bit digital modulation code to be selected is 2–7; and

step 4 for further selecting one 14-bit digital modulation code among the selected modulation codes at step 3 so that said one 14-bit digital modulation code satisfies the requirement that the absolute value of bit DSV (Digital Sum Value) for each bit in the modulation code is equal to or less than 7.

4,989,000
DATA STRING COMPRESSION USING ARITHMETIC ENCODING WITH SIMPLIFIED PROBABILITY SUBINTERVAL ESTIMATION

Dan S. Chevion, 43 Hantke Street, Haifa 34608; Ehud D. Karnin, 3/25 Alon Street, and Eugeniusz Walach, 1 Ciegel Street, both of Kiryat Motzkin 26418, all of Israel

Filed Jun. 19, 1989, Ser. No. 368,473
Claims priority, application Israel, Jul. 5, 1988, 86993
Int. Cl.[5] H03M 7/30
U.S. Cl. 341—107 11 Claims



1. A method for generating a compressed representation of a source data string, each symbol of said string being selected from a finite set of symbols, comprising the steps of:

(a) generating said compressed representation by Rissanen arithmetic encoding of said source symbols, said Rissanen encoding including generating for each symbol an arithmetic representation of a successive subinterval within a predetermined interval, the width of each subinterval being equal to the width of the previous subinterval weighted by the currently encoded symbol's frequency of occurrence; and

(b) approximating the width of said previous subinterval with a single SHIFT and ADD operation.

4,989,001
MICROCONTROLLER BASED RESOLVER-TO-DIGITAL CONVERTER

Peter G. Serev, Woodbury, Conn., assignor to Advanced Micro Controls, Inc., Washington Depot, Conn.

Filed Apr. 20, 1989, Ser. No. 340,855
Int. Cl.[5] H03M 1/48
U.S. Cl. 341—116 20 Claims

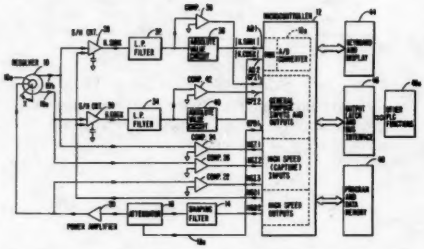
1. A resolver-to-digital converter comprising:

a resolver having a reference winding and first and second output windings;

a microcontroller having an A/D converter and a high-speed input/output section having first through third high-speed inputs and first and second high-speed outputs, said microcontroller generating at said second high-speed output a reference square wave having a selected frequency;

a shaping filter receiving said reference square wave and in response generating an initial sine wave which has the same selected frequency but is delayed in phase relative to the reference square wave, and a modulating circuit which receives said sine wave, applies a selected modulation thereto to generate a reference sine wave and drives said reference winding of said resolver with said reference sine wave to thereby cause said first and second winding to output respective first and second optput waves which have said selected frequency but are delayed in phase relative to said reference sine wave;

a first detection circuit detecting the crossing of a selected reference by said first output wave and supplying information regarding said crossing to said first high-speed input of said microcontroller, a second detection circuit detecting the crossing of a selected reference by said second output wave and supplying information regarding said crossing to said second high-speed input of said microcontroller, and a third detection circuit detecting the crossing of a selected reference by said reference sine wave and supplying information regarding said crossing to said third high-speed input of said microcontroller;



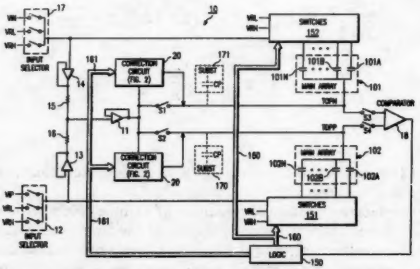
first and second sampling circuits which sample said first and second output waves, respectively, and supply respective samples to said A/D converter of said microcontroller for conversion thereof into digital values;

wherein said microcontroller uses said information supplied thereto at said first through third high-speed inputs to compute the phase delay of said first and second output waves and to provide at said first high-speed output a sampling signal applied to said sampling circuits to cause said sampling circuits to sample said first and second output waveforms at or about the 90 degree point and provide the resulting samples to said A/D converter, to thereby avoid or reduce quadrature and second harmonic effects.

4,989,002
COMMON-MODE ERROR SELF-CALIBRATION CIRCUIT AND METHOD OF OPERATION

Khen-Sang Tan, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 12, 1990, Ser. No. 478,312
Int. Cl.[5] H03M 1/10
U.S. Cl. 341—120 23 Claims



1. A circuit for removing parasitic capacitance from a system, wherein an input analog signal is referenced between first and second reference levels and wherein a positive analog

signal is applied to a first input of a comparator and wherein a negative analog signal is applied to a second input of the comparator, said circuit comprising:

circuitry for applying said first reference level to said first and second inputs so as to obtain first comparisons of the magnitudes of the common mode error of said first reference;

circuitry for applying said second reference level to said first and second inputs so as to obtain a second comparisons of the magnitudes of the common mode error of said second reference;

circuitry responsive to said first and second comparisons for generating control signals dependent upon said first and second comparisons; and

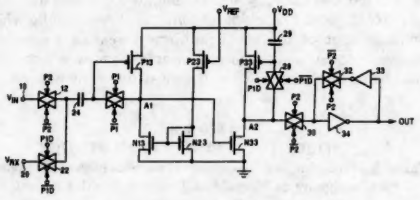
capacitance control circuitry for adding selected capacitance values to said system.

4,989,003

AUTOZEROED SET COMPARATOR CIRCUITRY

Donald J. Sauer, Allentown, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Jun. 19, 1989, Ser. No. 367,836
Int. Cl.[5] H03K *5/153*
U.S. Cl. 341—136 **11 Claims**



1. Comparator apparatus comprising:

first and second input-terminals for applying first and second signals to be compared;

a first capacitor having a first plate and a second plate;

first switch means for alternately coupling said first and second input terminals to said first plate;

a current source;

a first transistor having a control electrode coupled to said second plate, and a principal conduction path coupled in series with said current source, said current source and said first transistor forming a common source type amplifier having an output connection;

second switch means for alternately coupling and decoupling the output connection of said common source type amplifier to said control electrode of said first transistor;

a second transistor having a control electrode direct coupled to the output connection of said common source type amplifier and having a principal conduction path;

a third transistor having a control electrode, and a principal conduction path, the principal conduction paths of said second and third transistors being serially coupled to form a further common source type amplifier having an output connection;

a second capacitor having a first plate coupled to a point of fixed potential and a second plate coupled to the control electrode of said third transistor;

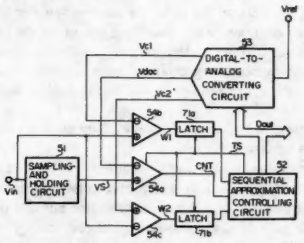
third switch means for alternately coupling and decoupling the output connection of said further common source type amplifier to the control electrode of said third transistor to sequentially auto zero said further common source amplifier.

4,989,004

ANALOG-TO-DIGITAL CONVERTING UNIT FOR SUCCESSIVE APPROXIMATION

Hideyo Kanayama, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Jun. 25, 1990, Ser. No. 543,156
Claims priority, application Japan, Jun. 30, 1989, 1-168678
Int. Cl.[5] H03M *1/38, 1/06*
U.S. Cl. 341—161 **5 Claims**



1. An analog-to-digital converting unit comprising

(a) a sampling-and-holding circuit supplied with an analog input voltage signal and producing a series of sampled voltage signals at time intervals,

(b) a sequential approximation controlling circuit responsive to a controlling signal and first and second warning signals and producing a digital output signal with a bit string,

(c) a digital-to-analog converting circuit supplied with said digital output signal and producing a comparison voltage signal depending upon said bit string and first and second critical signals respectively indicative of the uppermost and lowermost voltage levels of said analog input voltage signal to which said analog-to-digital converting unit responds,

(d) a first analog comparator circuit comparing one of said sampled voltage signals with said comparison voltage signal and producing said controlling signal,

(e) a second analog comparator circuit comparing said analog input voltage signal with said first critical signal and producing said first warning signal, and

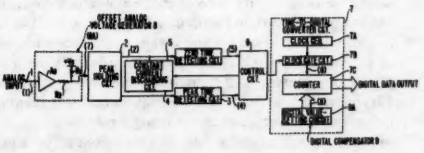
(f) a third analog comparator circuit comparing said analog input voltage signal with said second critical signal and producing said second warning signal, in which said sequential approximation controlling circuit restricts said bit string in the presence of either first or second warning signal so that said comparison voltage signal falls within a predetermined range regardless of said controlling signal.

4,989,005

METHOD OF ANALOG/DIGITAL CONVERSION

Yoshihiro Wakiyama, and Yoshiro Ohnishi, both of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan

Continuation-in-part of Ser. No. 948,139, Dec. 29, 1986, abandoned. This application Sep. 12, 1988, Ser. No. 244,552
Claims priority, application Japan, Dec. 28, 1985, 60-203324[U]
Int. Cl.[5] H03M *1/50*
U.S. Cl. 341—166 **12 Claims**



1. A method of analog/digital conversion for an analog/-digital converter having a peak-holding circuit for holding

peak-voltage of input analog data, a peak-time detecting circuit for detecting a point of time when said input analog data reaches a peak voltage, a constant-current discharging circuit for discharging the peak voltage held in said peak-holding circuit at a constant current from the peak point of time detected by said peak-time detecting circuit, a zero-time detecting circuit for detecting a zero point of time when a voltage held in said peak-holding circuit is reduced to zero, and a time-to-digital converting circuit for counting a number of pulses in a pulse line passing through a clock gate during a period of time from the point of time when the peak time is detected by said peak-time detecting circuit to the point of time when the zero time is detected by said zero-time detecting circuit, said pulses being counted by a counter so as to output digital data corresponding to said input analog data; comprising the steps of:

generating and adding a positive offset analog voltage to said input analog data; and

compensating digital data obtained by said time-to-digital converting circuit by a negative offset digital value equal to the number of pulses in a pulse line passing through said clock gate of said time-to-digital converting circuit for a period of time during which said input analog data has a value which is equal to zero.

4,989,006

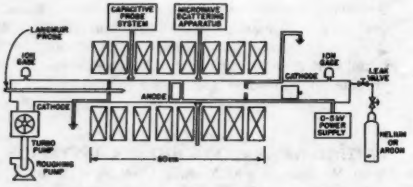
MICROWAVE ABSORPTION SYSTEM

John R. Roth, Knoxville, Tenn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 17, 1989, Ser. No. 425,141

Int. Cl.[5] H01Q *17/00*

U.S. Cl. 342—1 **14 Claims**



1. A microwave absorption system which protects a target from microwaveelectromagnetic radiation, said microwave absorption system comprising:

a means of producing a plasma which will circumscribe said target; and

a means for generating a varying magnetic field in said plasma to produce thereby a varying magnetized plasma which interacts with said microwave electromagnetic radiation to absorb and attenuate it before it reaches said target; where said generating means comprises a plurality of magnetic coils which are fixed in proximity with said producing means, and which collectively output said varying magnetic field with a variation factor in magnetic induction, said variation factor being a ratio of a maximum of said varying magnetic field in Tesla, divided by a minimum of said varying magnetic field in Tesla, as produced by said plurality of magnetic coils.

4,989,007

PASSIVE RADAR AUGMENTED PROJECTILE (PRAP)

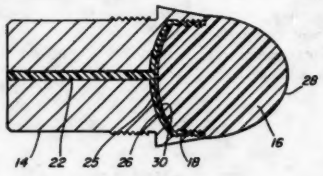
Clayton G. Coffey; William A. Jones, both of Medicine Hat, and William H. Friend, St. Bruno, all of Canada, assignors to Her Majesty in Right of Canada, as represented by the Minister of National Defence, Canada

Filed Jan. 28, 1987, Ser. No. 7,656

Claims priority, application United Kingdom, Feb. 10, 1986, 8603206

Int. Cl.[5] H01Q *15/00*

U.S. Cl. 342—11 **17 Claims**



1. A radar augmentor assembly for use in a gun-launched target projectile to increase the frontal radar cross-section of the target projectile to simulate an actual airborne threat on radar while maintaining aerodynamic flight stability, comprising a base member, a uniform dielectric lens attached to said base member and a resilient support means between said base member and said lens which prevents spalling of the lens due to stresses induced during gun-launching, wherein said dielectric lens is configured to provide a frontal radar return echo which simulates that of the actual airborne threat on radar, and wherein said resilient support means is in the form of a continuous film of a suitable resilient thermosetting resin material.

4,989,008

SPOTLIGHT MAPPING RADAR SYSTEM

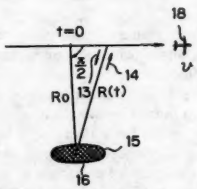
Takahiko Fujisaka, and Yoshimasa Oh-hashi, both of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1990, Ser. No. 472,342

Claims priority, application Japan, Oct. 2, 1989, 1-31651

Int. Cl.[5] G01S *13/00*

U.S. Cl. 342—25 **8 Claims**



1. A spotlight mapping radar system provided on a moving radar platform to obtain the picture of a stationary object to be observed comprising:

a transmission means for transmitting a radio wave toward said object;

a reception means for receiving said radio wave reflected from said object as an echo signal;

a pulse compression means for enhancing the range resolution of said received echo signal;

an azimuth compression means for enhancing the crossrange resolution of said received echo signal;

a reference signal generating means for generating a reference signal required for the azimuth compression;

a display buffer means for storing said received echo signal which has been processed by said compression means and

said azimuth compression means, as the signal representing the picture information of said object;

a display means for displaying the picture of said object to be observed in accordance with the signal representing the picture information output from said display buffer means; and

an inertial navigation system for measuring the movement of said radar platform to control said transmission means and said reference signal generating means, characterized in that:

said reception means includes a digital beam forming antenna means which has a plurality of antenna elements, and which is capable of converting the echo signals received by said plurality of antenna elements into corresponding digital signals and digitally processing them to form and output a plurality of reception beams oriented in different directions at the same time;

said pulse compression means, said azimuth compression means, said display buffer means and said reference signal generating means are provided respectively for each of the outputs of said digital beam forming antenna means at which said plurality of reception beams are output; and

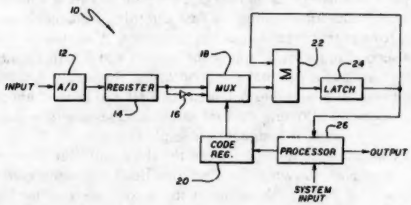
an output picture synthesizing means for synthesizing the signals representing the picture information output from said respective display buffer means and outputting said synthesized signals to said display means is provided.

4,989,009

DIGITAL RANGE CORRELATOR

Avinoam Zerkowitz, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 19, 1990, Ser. No. 497,750
Int. Cl.[5] G01S *13/28*
U.S. Cl. 342—145 **7 Claims**



1. A digital range correlator for detecting a target comprising: single analog-to-digital converter means for providing a plurality of digital words for each of a succession of range gates, each digital word including at least two bits;

accumulator means for summing the digital words in each range gate to provide an accumulated sum for each range gate; and

processor means for storing and for comparing the accumulated sums in each range gate to identify the particular range gate associated with the target.

4,989,010

METHOD AND DEVICE FOR IDENTICAL PROCESSING OF SEVERAL SIMULTANEOUS ANALOG SIGNALS OF SHORT DURATION AND TRACKING RADAR USING THIS DEVICE

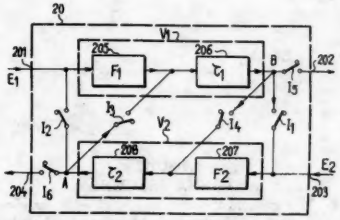
Roland Crevoulin, Paris; René Ambos, Morangis, and Jean-Joé l Bonnier, Ville D'Avray, all of France, assignors to Thomson CSF, Paris, France

Filed Dec. 21, 1983, Ser. No. 565,602
Claims priority, application France, Dec. 30, 1982, 82 22073
Int. Cl.[5] G01S *13/44, 7/40, 13/28*
U.S. Cl. 342—150 **5 Claims**

1. A range tracking radar comprising:

a transmission-reception antenna for receiving echo signals from bright points constituting the target and transmitting a linearly frequency-modulated microwave signal;

a recirculation device having (a) two elementary processing channels with respective inputs to which two signals to be processed are applied simultaneously and respective outputs, each said channel including an automatic gain control amplifier and a delay circuit connected serially to said amplifier, (b) two switches each connecting the output of the delay circuit of one channel to the input of the delay circuit of the other channel to form an analog memory loop for a duration which is a multiple of the sum of the delays and (c) two switches connecting the inputs and outputs of said channels for controlling a processing cycle in which echo signals pass successively and sequentially through said two channels;



means for generating a delayed replica of a transmission frequency ramp;

means for controlling delay of the replica of the frequency ramp relative to the transmission frequency ramp;

means utilizing the delayed replica to demodulate the signals at the outputs of the recirculation device for each cycle of the analog memory loop and produce demodulated signals;

filtering means for frequency filtering the demodulated signals to produce output signals;

means for processing the echo signals in accordance with the output signals of the filtering means; and

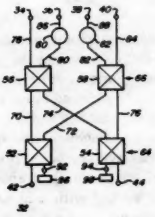
means for controlling the processing means.

4,989,011

DUAL MODE PHASED ARRAY ANTENNA SYSTEM

Harold A. Rosen, Santa Monica, and James D. Thompson, Manhattan Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 23, 1987, Ser. No. 111,909
Int. Cl.[5] H01Q *3/22*
U.S. Cl. 342—373 **17 Claims**



1. A direct-radiating array antenna system comprising:

an array of radiating elements arranged to transmit electromagnetic radiation; and

distribution network means, having a plurality of input ports and a plurality of output ports connected to the radiating elements, for distributing a plurality of distinct electromagnetic input signals applied to the input ports in a

predetermined manner to the output ports such that at least two distinguishable, independent composite beams of electromagnetic radiation having substantially the same far-field radiation pattern emanate from the radiating elements, wherein a first linear combination of individual beams emanating from the array of radiating elements together form a first one of the composite beams, and a second linear combination of individual beams emanating from the array of radiating elements together form a second one of the composite beams, the signals distributed to said output ports being defined by first and second sets thereof respectively associated with said two composite beams, wherein the signals in each of the sets thereof possess a preselected distribution of differing amplitudes and the distributions of amplitudes are essentially mirror images of each other.

4,989,012

ANTENNA ASSEMBLY

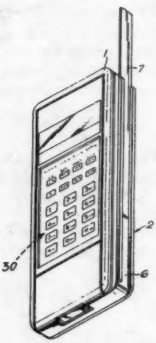
Nils E. W. Martensson, Woking, and Michael B. Ashdown, High Wycombe, both of England, assignors to Technophone Limited, Surrey, England

Continuation of Ser. No. 351,434, May 12, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 489,797

Claims priority, application United Kingdom, May 27, 1988, 8812703

Int. Cl.[5] H01Q *1/24*

U.S. Cl. 343—702 **22 Claims**



1. A radio and antenna assembly comprising a radio casing having walls which define a passageway, an existing antenna connected to said casing, and a connecting device for connecting an external antenna to a circuit inside said radio casing, said connecting device being suitably sized and shaped to be slidably receivable in said passageway and having first electrical contact means, said passageway being provided with a second electrical contact means generally transverse to the path of said passageway for mating with said first contact means to make an external antenna connection when said connecting device is slidably inserted into said passageway, said existing antenna being electrically disconnected from the circuit inside said radio casing as a result of sliding said connecting device into said passageway in order to make said external antenna connection whereby said connecting device can be removably attached to said radio casing for connecting an external antenna to a circuit inside said radio casing.

4,989,013

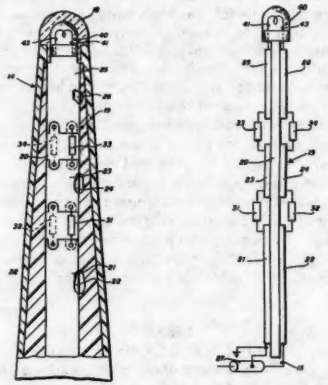
MULTIFREQUENCY ANTENNA HAVING A DC POWER PATH

Frank P. Smith, II, Dresher; Thomas R. Krishan, Newtown Square, both of Pa., and Hugh P. McAdams, Jr., Port Deposit, Md., assignors to Litton Systems, Inc., Springfield, Pa.

Filed Mar. 31, 1989, Ser. No. 332,208

Int. Cl.[5] H01Q *1/06*

U.S. Cl. 343—721 **19 Claims**



1. An antenna for transmitting plural frequency signals comprising:

first and second antenna segments each having a length A for optimal transmission of a signal having a frequency A;

third and fourth antenna segments each having a length B;

a first inductor coupling the first and third segments in series for optimal rejection of the frequency A signal

a second inductor coupling the second and fourth segments in series for optimal rejection of the frequency A signal;

a capacitive coupling between the first and second antenna segments allowing the first and second segments to radiate the frequency A signal as a single segment;

a capacitive coupling between the third and fourth antenna segments allowing the first and third segments and the second and fourth segments to transmit a signal having a frequency B as a single segment;

a single antenna lead coupled to the second antenna segment coupling plural frequency signals to the antenna; and

an illumination device having first and second leads, wherein the first lead is coupled to the third segment and the second lead is coupled to the fourth segment, whereby a first direct current path is formed comprising the single lead, the first segment, the first inductor, the third segment and the first lead, and whereby a second direct current path is formed comprising the second lead, the fourth segment, the second inductor, and the second segment.

4,989,014

RECEPTION ANTENNA SYSTEM

Louis Kocsi, 25 Palisade Ave., Garfield, N.J. 07026

Continuation-in-part of Ser. No. 293,976, Jan. 6, 1989, abandoned, which is a continuation-in-part of Ser. No. 40,847, Apr. 20, 1987. This application Nov. 6, 1989, Ser. No. 432,209

Int. Cl.[5] H01Q *11/12*

U.S. Cl. 343—742 **12 Claims**

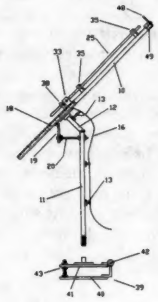
1. A reception antenna system for electrical connection to the positive and negative sides of a transmission feedline, said system comprising:

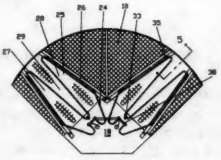
(a) a reflector defined by one-quarter of a polar segment of a circle, said reflector further having circumferential

raised edges providing reflected electromagnetic radiation patterns to said reflector;

(b) at least two electrically conductive open-end radial loop pairs, having positive and negative ends, of hollow substantially scalene triangular loops, each loop of each pair being internally symmetric about a radius of said reflector, and said loop pairs uniformly offset from said reflector by insulative mounting means; and

(c) upon said reflector, means for electrically connecting one negative end of one of said open ended loop pairs to an





adjacent negative end of another of said loop pairs to thereby define at least two loop pairs, each of said two loop pairs comprising a single conductive array which is electrically, but not radiationally, discreet from said reflector, and in which one loop end of each loop pair is connected to a corresponding positive or negative side respectively of said transmission feedline, whereby the electromagnetic geometry of said conductive loop pairs of said conductive array will amplify signals received from said reflector to provide an effective reception antenna system.

4,989,015

UNFURLABLE MESH REFLECTOR

Stanley S. Chang, Palos Verdes Estates, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 26, 1987, Ser. No. 112,592

Int. Cl.[5] H01Q *15/20*

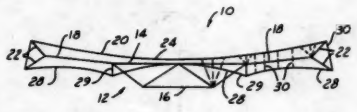
U.S. Cl. 343—915 **9 Claims**

1. An unfurlable antenna reflector comprising:

a rigid central truss having front and rear sides;

a plurality of deployable booms each having an inner end and an outer end with said inner ends being connected to said truss at pivot points circumferentially spaced around said truss for pivoting movement of said booms between a retracted position, wherein said booms are substantially coplanar, and a deployed position, wherein they extend radially away from said central truss in a generally spoke-like array, the outer ends of said booms defining an imaginary plane which is spaced forwardly from said truss, and wherein further, each of said boom pivot points has a pivot axis oriented such that said boom pivot axes are substantially parallel, said booms being positioned and dimensioned so that, in their retracted position the outer end of each boom lies adjacent the inner end of the next circumferentially adjacent boom;

a front net comprising cables interconnecting said boom outer ends, said front net being tensioned when said



booms are in their deployed position and spanning the area between said booms said front net being spaced forwardly from said booms and said truss so that said truss lies totally behind said front net;

reinforcing tension means interconnecting said booms and said truss and being located on the rear side of said booms to minimize deflection of said booms by said front net;

a flexible radio frequency-reflecting mesh-like reflector surface connected to and substantially coextensive with said front net and deployed forwardly of said front side of said truss when said booms are in their deployed position, said reflector surface being contoured into a predetermined non-planar shape by its connections to said front net.

4,989,016

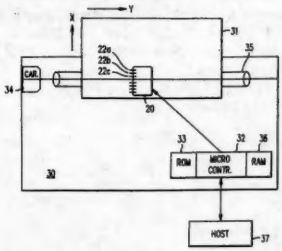
METHOD AND APPARATUS FOR TIME DISTRIBUTED USE OF INK-JETS IN A PRINTER-PLOTTER

Ronald A. Gatten, Pleasanton, and Lawrence R. Joba, Santa Cruz, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed May 8, 1989, Ser. No. 348,842

Int. Cl.[5] B41J *2/01;* **G01D** *3/08*

U.S. Cl. 346—1.1 **12 Claims**



1. A method for using a plotter having a plotting means with a plurality of jets for plotting and a control means for controlling the plotting means, comprising the steps of:

moving the plotting means across a medium repeatedly;

plotting a graph on the medium including a plurality of non-parallel lines; and

alternating between two or more jets used for plotting upon completion of plotting of the graph.

4,989,017

THERMAL PRINT HEAD

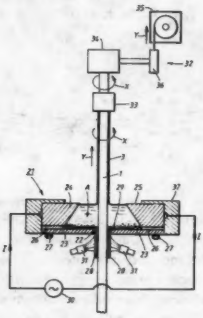
Goro Oda; Niro Nagata; Yoshitsugu Nakatomi, all of Kanagawa, and Takashi Sawafuji, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 937,483, Dec. 3, 1986, abandoned. This application Feb. 22, 1988, Ser. No. 161,368

Claims priority, application Japan, Dec. 26, 1985, 60-292044

Int. Cl.[5] G01D *15/10*

U.S. Cl. 346—76 PH 10 Claims



1. A thermal print head with minimal faults characterized by a thin, fine glass film of uniform thickness less than 100 μm which is substantially without pinholes bonded to a base manufactured according to the steps of:

supplying electric power across opposed electrodes disposed in a furnace accommodating glass to cause electric current to flow through said glass so as to melt said glass;

passing an elongated base once through molten glass accommodated in said furnace such that all points on the surface of said base traverse the same temperatures of molten glass during said passing to form said glass film on said base having a thickness in the range of about 10 μm to less than 100 μm; and

forming heating elements on said glass glaze layer.

4,989,018

RECORDING APPARATUS HAVING LINEAR ARRAY OF DOT-FORMING ELEMENTS FOR LINE-BY-LINE RECORDING, INCLUDING MEANS OF IMPROVING IMAGE QUALITY

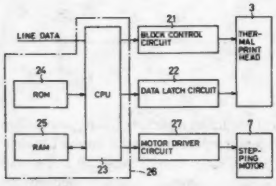
Michio Tsuchiya, Nagoya; Masaaki Terazawa, Ichinomiya, and Yutaka Nonomura, Iwakura, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jul. 24, 1989, Ser. No. 383,602

Claims priority, application Japan, Jul. 27, 1988, 63-187160; Oct. 24, 1988, 63-266062

Int. Cl.[5] G01D *15/10*; H04N *1/21*

U.S. Cl. 346—76 PH 17 Claims



1. A recording apparatus for recording images on a planar recording medium, comprising:

a print head having a plurality of dot-forming elements arranged in a straight row, for recording dots in a recording line parallel to said straight row, an effective recording size of each of said dot-forming elements in a feeding direction of the recording medium perpendicular to said straight row being smaller than a thickness of said recording line in said feeding direction;

medium support means for supporting said recording medium such that said print head faces a surface of said recording medium;

feeding means for feeding said recording medium and said print head relative to each other in said feeding direction; and

control means for selectively energizing said dot-forming elements to effect a primary recording operation such that upper edges of said dot-forming elements are substantially aligned with an upper end of said recording line, and controls said feeding means to feed said recording medium and said print head relative to each other in said feeding direction by a predetermined distance after energization of said dot-forming elements, until lower edges of said dot-forming elements are substantially aligned with a lower end of said recording line, said control means selectively energizing, after said recording medium and said print head have been fed by said predetermined distance, those of said dot-forming elements which have been energized for said primary operation, whereby a secondary recording operation is effected with the lower edges substantially aligned with the lower end of said recording line.

4,989,019

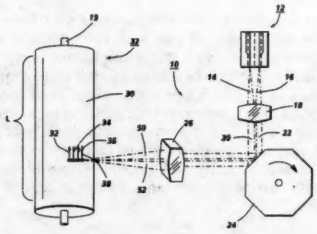
MULTI-BEAM SCANNING SYSTEM COMPENSATED FOR BANDING

Robert P. Loce, Rochester; William L. Lama, Webster, both of N.Y., and Per S. Nylen, Sollentuna, Sweden, assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 25, 1990, Ser. No. 469,987

Int. Cl.[5] H04N *1/21*

U.S. Cl. 346—108 3 Claims



1. A multi beam scanning apparatus comprising:

a laser light source for generating a plurality of light beam outputs,

optical scanning means for receiving said output beams and directing the beams as a plurality of scanning beams to simultaneously form a plurality of raster scanned lines on the surface of a photosensitive image plane,

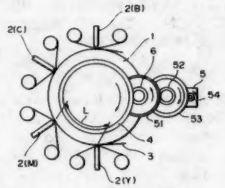
the invention characterized by each consecutive line being formed by non-consecutive scans the lines being interlaced by an interlacing order greater than one, horizontal banding in the output scan lines being increasingly minimized as the interlacing order increases.

4,989,020

PRINTING FEEDING APPARATUS FOR PRINTERS

Hideyuki Namba, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 5, 1990, Ser. No. 475,503
Claims priority, application Japan, Feb. 7, 1989, 1-028335
Int. Cl.[5] G01D *15/06;* G03G *15/01*
U.S. Cl. 346—157 15 Claims



1. An apparatus for feeding a printing sheet in a printer: comprising means for defining passage for feeding a printing sheet to be printed; a plurality of printing heads arranged along said sheet feeding passage; and a drive means for moving said printing sheet along said sheet feeding passage so that said plurality of printing heads print in turn, said printing sheet while the printing sheet is moved along said sheet feeding passage, said driving means including a reduction gear train including a large gear connected to said sheet moving means and another gear connected to a drive motor, whereby said printing sheet is moved by said motor via said reduction gear train;

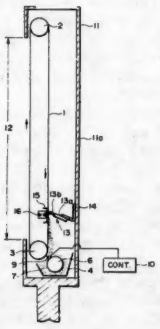
characterized in that a distance between at least two of said printing heads in the sheet feeding direction is equal to a distance along which said printing sheet is moved during the rotation of at least one of said reduction gears, except for said large gear, by an integral number of revolutions.

4,989,021

CLEANING DEVICE FOR CONDUCTIVE MAGNETIC TONER AND IMAGE RECORDING APPARATUS USING SAME

Toshihiko Ochiai, Tokyo, and Yujiro Ando, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,063
Claims priority, application Japan, Nov. 17, 1987, 62-288428
Int. Cl.[5] G01D *15/00*
U.S. Cl. 346—160.1 11 Claims



1. A cleaning device for removing toner from a recording medium after a toner image is formed on the recording medium by application of a voltage between a recording electrode and the recording medium with the toner which is electrically conductive and magnetic and is supplied from a toner container into the space between the recording electrode and the recording medium moving relative to the electrode, the improvement comprising:

a brush of soft and electrically conductive material for rubbing the removing toner from one side of said recording medium at a position where the recording medium carries the toner downwardly, said brush rubbing said recording medium along the same direction of movement of said recording medium, said brush being disposed above said toner container to permit the toner removed by said brush to fall and be received by said toner container;

a supporting member for supporting said brush adjacent the position where said brush rubs said recording medium; and

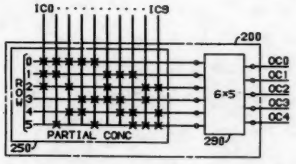
magnetic means disposed at another side of said recording medium opposite said brush.

4,989,022

REARRANGEABLE MULTICONNECTION SWITCHING NETWORKS CONSTRUCTED USING COMBINATORIAL DESIGNS

Frank K. Hwang, Warren, N.J., and Gaylord W. Richards, Naperville, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 946,431, Dec. 23, 1986, Pat. No. 4,887,079.
This application Jul. 19, 1989, Ser. No. 382,509
Int. Cl.[5] H04Q *1/00;* H04B *13/02*
U.S. Cl. 340—825.8 6 Claims



1. A switching network for selectively connecting N_1 input channels to n_2 output channels such that none of said n_2 output channels is connected to more than one of said N_1 input channels at any time, N_1 and n_2 being positive integers each greater than one, n_2 being at most equal to N_1, said switching network comprising

a partial concentrator having N_1 columns each connected to a different one of said N_1 input channels, and v rows, said partial concentrator comprising means for selectively connecting ones of said columns to ones of said rows, v being a positive integer at least equal to n_2, and

a switch having n_2 outlets each connected to a different one of said output channels and v inlets each connected to a different one of said rows, said switch comprising means for selectively connecting said outlets to said inlets,

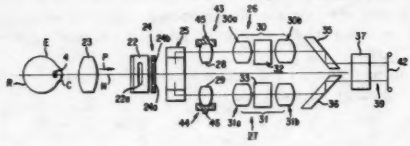
said partial concenttrator being derivable from a partial concentrator having c columns and b rows and having each of said c columns incident to ones of said b rows defined by a corresponding row of a (b,c,r,M,w) block design, where a column is said to be incident to a row if there is a crosspoint at the intersection, where each of said c columns has a unique column designation, where the elements of said block design are the column designations of said c columns, where b,c,r, and M are positive integers each greater than one, where w is a positive integer, where M+w is greater than three, where b is at least equal to v, and where c is at least equal to N_1.

4,989,023

STEREO TYPE EYE FUNDUS CAMERA

Aki Sakurai, and Ryoichi Nadachi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan

Filed Apr. 12, 1990, Ser. No. 507,844
Claims priority, application Japan, Apr. 14, 1989, 1-94753
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—62 **12 Claims**



1. A stereo type eye fundus camera including an illumination optical system for illuminating the fundus of an eye to be tested, and a stereo type image formation optical system for simultaneously forming an image of the eye fundus on a sheet of film based on a reflected light from the eye fundus,

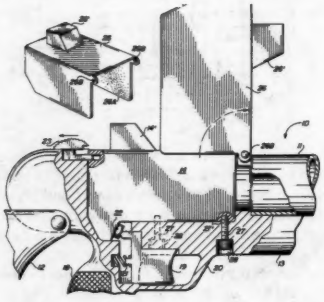
said stereo type eye fundus camera further including a density pattern member adapted to form a density pattern image on said eye fundus.

4,989,024

PHOTOGRAPHIC GUN

Jeff D. Myers, 7898 E. Acoma Dr., Scottsdale, Ariz. 85260

Continuation-in-part of Ser. No. 274,956, Nov. 22, 1988, Pat. No. 4,907,022. This application Mar. 1, 1990, Ser. No. 487,187
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—76 **12 Claims**



1. A simulated weapon for taking photographic pictures of game sighted with the weapon comprising:

a gun,

said gun comprising frame,

a hand grip mounted on said frame,

a trigger mounted on said frame adjacent to said hand grip,

a hollow elongated barrel mounted on said frame and having a simulated firing chamber,

a camera mounted on said frame and comprising a shutter,

a cover mounted on said frame, and

means connected to said trigger for actuating the shutter of said camera upon the application of a predetermined pressure to said trigger,

said camera taking a picture of the game sighted by the user through said barrel of the weapon,

said cover being pivotally mounted on said frame for movement to and from said firing chamber,

said cover when moved away from said firing chamber exposing said camera for film changing purposes.

4,989,025

CAMERA

Koichi Matsumura, and Akira Yoshihara, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 186,101, Apr. 25, 1988, abandoned. This application Jan. 5, 1990, Ser. No. 462,866
Claims priority, application Japan, Apr. 27, 1987, 62-102013; Apr. 27, 1987, 62-102014; Apr. 27, 1987, 62-102015; Apr. 27, 1987, 62-102016; Apr. 27, 1987, 62-102017; Apr. 27, 1987, 62-102018; Jul. 3, 1987, 62-167536; Jul. 3, 1987, 62-167537; Jul. 3, 1987, 62-167538; Nov. 27, 1987, 62-299018; Oct. 2, 1988, 63-027685; Oct. 2, 1988, 63-027686
Int. Cl.[5] G03B *17/24*
U.S. Cl. 354—106 **129 Claims**

1. A data imprinting device for a camera comprising:

(A) calculating means for calculating automatically the lapse of time from any specified time to the current time; and

(B) imprinting means for imprinting said lapse of time calculated by said calculating means on a sensitive means; and

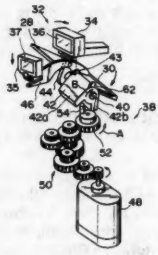
(C) selection means for causing said imprinting means to select either of said current time or said lapse of time.

4,989,026

BIFOCAL CAMERA

Tatsuya Suzuki, Tokyo, and Shunji Matsutani, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1990, Ser. No. 496,967
Claims priority, application Japan, Apr. 3, 1989, 1-84441; Apr. 3, 1989, 1-84442
Int. Cl.[5] G03B *1/00, 3/00*
U.S. Cl. 354—150 **16 Claims**



1. A bifocal camera comprising:

a first photographic optical system;

a second photographic optical system arranged substantially in parallel to said first photographic optical system and having a focal length different from a focal length of said first photographic optical system;

a stationary mirror arranged on an optical axis of said first photographic optical system;

a camera body containing said first and second photographic optical systems and having an exposure opening situated on an optical axis of said second photographic optical system;

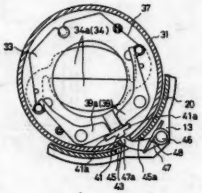
a movable mirror movable between a first position where said movable mirror interrupts incident light beams passed through said second photographic optical system, and guides incident light beams, which are passed through said first photographic optical system and reflected by said stationary mirror, to the exposure opening, and a second position where said movable mirror interrupts light beams reflected from said stationary mirror, and allows incident light beams from said second photographic optical system to be made incident to the exposure opening; and

drive means for shifting said movable mirror to the first position and the second position selectively, in response to a mode switching signal, and shifting the movable mirror to the second position in accordance with an operation of rewinding a film.

4,989,027
BARRIER MECHANISM OF CAMERA

Haruo Ishii; Shinsuke Kohmoto, and Hiroshi Nomura, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1989, Ser. No. 318,336
Claims priority, application Japan, Mar. 4, 1988, 63-28981[U]; Mar. 9, 1988, 63-31043[U]; Mar. 9, 1988, 63-31044[U]
Int. Cl.[5] G03B 9/26
U.S. Cl. 354—253 **29 Claims**



1. A barrier mechanism of a camera comprising a cylindrical lens cover having a front end with an aperture therein, said barrier mechanism being supported to move between an open, photographing position and a closed, accommodating position, said cylindrical lens cover being provided with a cam ring which moves said cylindrical lens cover between said photographing position and said accommodating position in accordance with a rotation of said cam ring, at least two barriers which are provided on said front end of said cylindrical lens cover to open and close said aperture in said cylindrical lens cover, and a barrier opening and closing mechanism which opens and closes said barriers in association with said rotation of said cam ring,

wherein said barrier opening and closing mechanism comprises spring means for biasing said barriers to said open position; an opening and closing pin which can be moved in radial directions of said cylindrical lens cover and which closes said barriers against said spring biasing means when said opening and closing pin moves in one radial direction; and a closing lever which is located at a predetermined position outside said cylindrical lens cover and which is biased to rotate and press said opening and closing pin to close said barriers, said cam ring being located to prevent said closing lever from contacting said opening and closing pin when said barriers are to be in said photographing position, said cam ring being provided with an opening which permits said closing lever to engage said opening and closing pin to close said barriers when said cylindrical lens cover is moved to said accommodating position.

4,989,028
APPARATUS FOR PROCESSING LIGHT SENSITIVE MATERIAL

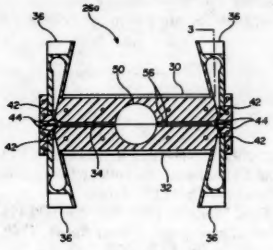
Douglas O. Hall, Farmington; Lee F. Frank, and Bruce R. Muller, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 25, 1989, Ser. No. 426,349
Int. Cl.[5] G03D 3/02, 3/08
U.S. Cl. 354—324 **14 Claims**

1. A fluid suspension apparatus for receiving a processing fluid for processing a strip or sheet of light sensitive material, said apparatus comprising:

a device defining an elongated fluid chamber having an entrance at one end and an exit at the other end to allow the light sensitive material to travel through the suspension apparatus; and

processing fluid application means for applying the processing fluid to the light sensitive material, said means being located at said entrance and exit of said device to create fluid layers on opposite sides of the light sensitive material so that the fluid flows towards a midpoint of said device, whereby the light sensitive material is suspended between

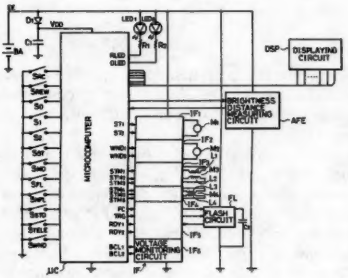


said fluid layers as the material travels through the suspension apparatus.

4,989,029
CAMERA WITH CONTROL APPARATUS FOR CHARGING STORAGE CAPACITOR FOR FLASH LIGHT EMISSION

Manabu Inoue, and Hiroyuki Okada, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 19, 1989, Ser. No. 340,460
Claims priority, application Japan, Apr. 20, 1988, 63-53365; Apr. 20, 1988, 63-53366
Int. Cl.[5] G03B 7/00
U.S. Cl. 354—418 **18 Claims**



1. A camera comprising:

(a) power supply means serving as a driving source of the camera;

(b) boosting means connected to said power supply means for boosting potential of said power supply means to a prescribed potential;

(c) capacitor means connected to said boosting means for storing energy;

(d) potential detecting means for detecting the potential of said capacitor means;

(e) boosting operation starting signal outputting means for outputting a signal for starting operation of said boosting means;

(f) timer means responsive to said boosting operation starting signal for measuring a prescribed time period;

(g) indicating means for deenergizing an indication corresponding to an output level of said potential detecting means before a lapse of said prescribed time period and giving the indication after the lapse of said prescribed time period;

(h) a first operating member for switching between a first state and a second state;

(i) controlling means for controlling said camera such that the camera is set in an operative state when said first

operating member is in said first sate and in an inoperative state when said member is in said second state; and

(j) a second operating member for starting the operation of said boosting operation starting signal outputting means when said first operating member is in said first state.

4,989,030

PROGRAM SHUTTER DRIVE SYSTEM

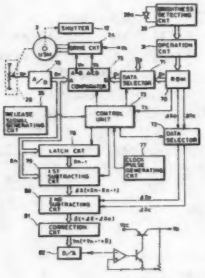
Yoji Naka, and Yutaka Yoshida, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Mar. 29, 1989, Ser. No. 330,198

Claims priority, application Japan, Apr. 1, 1988, 63-80334

Int. Cl.[5] G03B *7/08*

U.S. Cl. 354—435 **6 Claims**



1. A program shutter system for controlling an opening size of a shutter according to a programmed schedule according to a brightness of a subject to be photographed, said system comprising:

means for determining an exposure based on brightness of the subject and producing an exposure control output signal corresponding to the determined exposure;

an ultrasonic motor for driving said shutter between open and close position; said ultrasonic motor being operative to rotate in a first direction to drive said shutter toward the open position and to rotate in a second direction opposite to the first direction of rotation thereof to drive said shutter toward the close position;

control signal generating means for continuously providing a position indicating signal according to a predetermined program of operating representing the instantaneous opening size of said shutter, said position indicating signal defining a programmed schedule of operation of said shutter corresponding to said proper exposure output;

position detecting means for continuously providing an actual position signal representing an actual opening size of said shutter;

means for continuously comparing said position indicating signal with said actual position signal as said ultrasonic motor rotates in the first direction to drive said shutter toward the open position and as said ultrasonic motor rotates in the second direction to drive said shutter toward the close position to produce a differential drive signal proportional to a difference between said position indicating signal and said actual position signal; and

controlling means responsive to said comparing means for controlling rotation of said ultrasonic motor, said controlling means including means for driving said ultrasonic motor at a differential speed that varies with said differential drive signal.

4,989,031

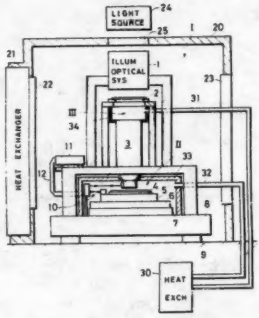
PROJECTION EXPOSURE APPARATUS

Saburo Kamiya, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Jan. 29, 1990, Ser. No. 471,375

Int. Cl.[5] G03B *27/52, 27/42*

U.S. Cl. 355—30 **4 Claims**



1. A projection exposure apparatus comprising:

an illuminating optical system for irradiating a first object with light emitted from a light source;

a projection optical system for projecting an image of said first object onto a second object;

an external housing forming a first chamber for enclosing said illuminating optical system and said projection optical system;

an internal housing forming a second chamber arranged inside said first chamber to enclose a space containing an optical path formed between said projection optical system and said second object; and

temperature adjusting means for separately adjusting an internal air temperature in each of said first and second chambers.

4,989,032

PROOF LIGHT

Frank A. Hull, Circle Pines, Minn., and H. Brent Archer, Miami, Fla., assignors to Chesley F. Carlson Company, Plymouth, Minn.

Continuation of Ser. No. 19,182, Feb. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 834,897, Feb. 28, 1986, abandoned. This application May 16, 1989, Ser. No. 355,046

Int. Cl.[5] G03B *27/80*

U.S. Cl. 355—38 **21 Claims**

1. A color and position proof lighting system for exposing a light sensitive medium comprising:

a light integrating chamber for mixing light of different spectral values:

a light course positioned adjacent to and directed into the integrating chamber to provide the light of different spectral values;

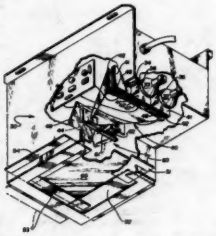
color filter means interposed between the light source and the integrating chamber to create the filtered light having the different spectral values;

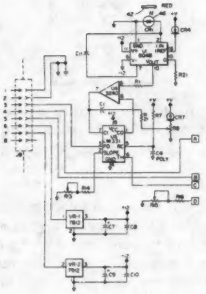
means for determining the desired amount of illumination for each spectral value;

means for measuring the amount of illumination of each spectral value; and

control means for continuously controlling illumination of the light source so that the desired amount of filtered light

of each spectral value from the light source is directed onto the light sensitive medium





said control means including means for balancing the dominance of any one of said spectral values relative to the other spectral values.

4,989,033

PROCESS CAMERA

Miyuki Yamashita, Tokyo, Japan, assignor to Hirakawa Kogyo-sha Co., Ltd., Tokyo, Japan

Filed Nov. 1, 1989, Ser. No. 430,586

Claims priority, application Japan, Nov. 1, 1988, 63-276834; Dec. 9, 1988, 63-311418

Int. Cl.[5] G03B *27/52, 27/58, 27/70*

U.S. Cl. 355—43 **6 Claims**

1. A process camera comprising:

a horizontal copyboard for placing a copy thereon;

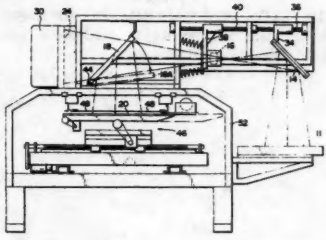
a horizontal platen for supporting a photosensitive medium thereon, said platen being movable in a plane parallel to a surface thereof on which the photosensitive medium can be supported and along two axes perpendicular to each other;

two pairs of mask plates disposed in front of and parallel to said surface of the platen, one pair of said mask plates being independently movable along one of said two axes which are perpendicular to each other, while the other pair of said mask plates are independently movable along the other axis;

a mirror disposed above said copyboard for laterally reflecting light from the copyboard;

a focusing lens disposed in an optical path along which the light reflected by said mirror travels;

a movable mirror disposed above said platen and movable into and out of the optical axis of said focusing lens, said movable mirror being capable of bending the optical axis of said focusing lens toward said platen when the movable mirror is moved into the optical axis of said focusing lens;



an index plate positioned on the optical axis of said focusing mirror when said movable mirror is moved out of said optical axis, said index plate being disposed in conjugate relation to said platen; and

means for photographing images of text and outside page information marks for pagenation on the photosensitive medium on said platen in a predetermined sequence while moving said platen and said mask plates.

4,989,034

METHOD OF ELIMINATING CUSHION DISTORTION

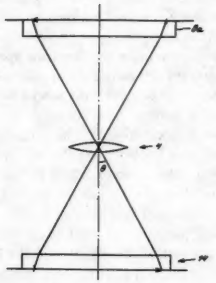
Finn Hougaard, Copenhagen, Denmark, assignor to Eskofot A/S, Ballerup, Denmark

Continuation of Ser. No. 184,840, Apr. 22, 1988, abandoned. This application Jan. 10, 1990, Ser. No. 463,881

Claims priority, application Denmark, May 4, 1987, 2273/87

Int. Cl.[5] G03B *27/68*

U.S. Cl. 355—52 **8 Claims**



1. A method of eliminating cushion distortion, introduced by the use of a glass plate for the purpose of securing an original to be copied, in the use of reproduction equipment of the type having an image plane, an objective lens disposed in an objective plane and a plane for the original to be reproduced with the image plane and the plane for the original being located on opposite sides of said objective plane and said glass plate being disposed adjacent to said plane for the original in order to insure that said original lies flat, the method comprising the step of placing an additional glass plate on the side of the objective plane opposite said glass plate and in advance of the image plane, said additional glass plate being of the same thickness as said glass plate so as to compensate for any distortion

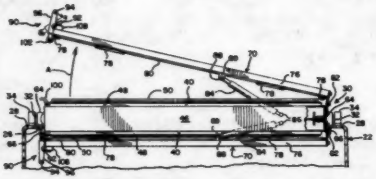
introduced by said glass plate adjacent to said plane for the original.

4,989,035

LATCH SYSTEM FOR VACUUM FRAME ASSEMBLY

Charles J. Leonhart, Schaumburg, Ill., assignor to nuArc Company, Inc., Niles, Ill.

Filed Jun. 21, 1989, Ser. No. 369,334
Int. Cl.[5] G03B *27/20*
U.S. Cl. 355—93 **22 Claims**



1. A latch and lift system for a vacuum frame assembly of the type including a rectangular base supporting at least one glass frame having one side hingedly attached along one side of the base for movement between a closed position, generally parallel of a working face of said base and liftable to an open position angularly divergent from said working face for providing access to a space between said frame and working face, said latch and lift system comprising:

a plurality of separate latch mechanisms spaced apart longitudinally along an opposite side of said base and an opposite side of said frame adjacent thereto when said frame is in said closed position;

each of said latch mechanisms including a latch lever pivotally mounted on a support fixedly attached to one of said opposite side of said base or frame for movement about a pivot axis parallel of one side, a latch strike fixedly attached to the other of said opposite sides of said frame or base, and latch means on said lever remote from said support for contact with said latch strike for securing said latch lever in a latched position with respect to said latch strike; and

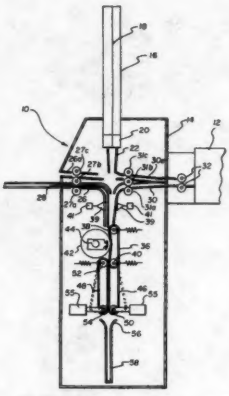
a latch actuator rod and lift handle extending parallel of said one of said opposite sides of said base or frame for interconnecting said levers of said plurality of latch mechanisms, said handle connected to said levers for movement about said pivot axes of said latch mechanism to move the same in unison in one direction for latchably securing said glass frame and said base together at a plurality of points along said one of said opposite sides and in an opposite direction for releasing said glass frame from said base in readiness to move to said other position when a lift force applied to said handle is exerted in another direction generally normal to said glass frame.

4,989,036

FILM DUPLICATOR

William B. Wilson, Hamlin, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 2, 1990, Ser. No. 503,505
Int. Cl.[5] G03B *27/30*
U.S. Cl. 355—106 **6 Claims**



1. In a film duplicator for producing a copy of an original sheet on a copy sheet, the combination comprising:

means for positioning said sheets in approximate face-to-face relationship;

copying means;

an alignment means below said copying means for aligning said sheets under the influence of gravity;

means for transporting said sheets along a sheet path past said copying means to said alignment means; and

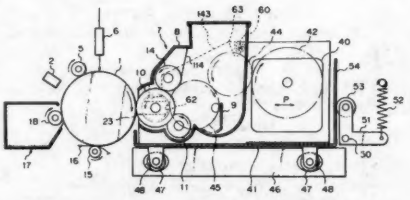
means for transporting said sheets in aligned relationship along said path back to said copying means.

4,989,037

DEVICE FOR DRIVING A ROTARY BODY

Shinji Nagatsuna, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 373,173
Claims priority, application Japan, Jun. 30, 1988, 63-85754
Int. Cl.[5] G03G *15/06*
U.S. Cl. 355—200 **10 Claims**



1. A device for driving a second rotary body in a rotary motion by transmitting a driving force from a drive source to said second rotary body, comprising:

a first rotary body rotatably supported by a body of a machine for rotation about a first rotary body axis of rotation;

a movable carrier on which said drive source is securely mounted and said second rotary body is rotatably mounted, by rotatable mounting means, for rotation about a second rotary body axis of rotation, said movable carrier being movable toward and away from said first rotary body, the driving force of said drive source being applied

to one end of said second rotary body and exerting a tangential force thereon which is borne by said movable carrier through said rotatable mounting means to prevent opposite ends of said second rotary body from moving relative to said movable carrier;

guide means for guiding said movable carrier toward and away from the first rotary body along a predetermined path which positions the second rotary body axis of rotation substantially parallel to the first rotary body axis of rotation; and

biasing means for biasing said movable carrier toward said first rotary body so that said second rotary body is held in uniform pressing contact with said first rotary body.

4,989,038

IMAGE FORMING APPARATUS UTILIZING A LIGHT IMAGE MEMORY

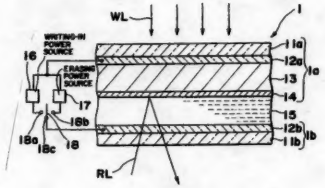
Toshiaki Kobayashi, and Shougo Iwai, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

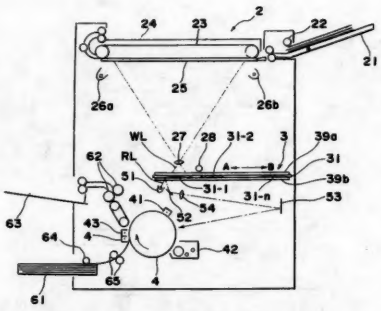
Filed Aug. 3, 1989, Ser. No. 388,947

Claims priority, application Japan, Aug. 18, 1988, 63-204949; Aug. 18, 1988, 63-204950; Sep. 2, 1988, 63-220788

Int. Cl.[5] G03G *21/00*; H04N *1/29*

U.S. Cl. 355—202 **30 Claims**





1. An image forming apparatus comprising:

an image memory plate having a light image memory for storing image information of a document when reflected light having the image information from the document is projected onto a first surface thereof, and for reading out the image information stored therein in the form of reflected light when light is projected onto a second surface thereof by a light source;

holder means for detachably holding said image memory plate;

moving means for moving said holder means so as to project the reflected light from the document onto first surface of said light image memory and to project the light from said light source onto said second surface of said light image memory; and

image formation means for forming the image of the image information onto a paper in accordance with the reflected light from said light image memory.

4,989,039

IMAGE FORMING APPARATUS RESPONSIVE TO ENVIRONMENTAL CONDITIONS

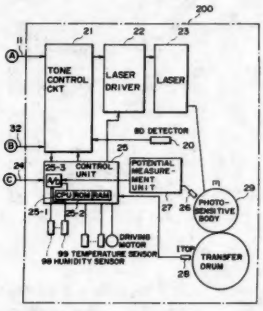
Kimiyoshi Hayashi, Soka; Kenichi Suda, Yokohama, and Kazuhiko Hirooka, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 14, 1988, Ser. No. 144,047

Claims priority, application Japan, Jan. 19, 1987, 62-9461; Jan. 19, 1987, 62-9462; Jan. 19, 1987, 62-9463; Jan. 19, 1987, 62-9464; Jan. 19, 1987, 62-9465

Int. Cl.[5] G03G *21/00*; G03B *27/72*

U.S. Cl. 355—208 **11 Claims**



1. An image forming apparatus comprising:

image forming means for forming an image on a recording member, said image forming means including exposure means for exposing said recording member;

first detector means for detecting a surface condition of said recording member;

second detector means for detecting environmental conditions in the apparatus; and

control means for controlling an operational condition of said image forming means in accordance with outputs of said first and second detector means, said control means selecting one reference value from among a plurality of predetermined different reference values in accordance with an output from said second detector means, the operational condition of said image forming means being determined in accordance with (1) the selected reference value, and (2) an output of said first detector means, the amount of light of said exposure means being selected in accordance with the output of said second detector means.

4,989,040

POSITION INPUT APPARATUS ENCLUDING A POSITION DETECTOR INPUT APPARATUS

Toshihisa Matsuo, Yamatokoriyama; Kazuyuki Ougita, Nara; Junichi Kajiwara, Yamatokoriyama, and Masakiyo Okuda, Kashiwara, all of Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Dec. 20, 1988, Ser. No. 286,961

Claims priority, application Japan, Dec. 21, 1987, 62-324791; Dec. 21, 1987, 62-194327[U]; Dec. 21, 1987, 62-194328[U]

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—218 **14 Claims**

1. A position input apparatus comprising

position detecting means for applying output corresponding to a pressed position;

complementary operating means for operating to complement the pressed position on the basis of both an output applied from the position detecting means and an output

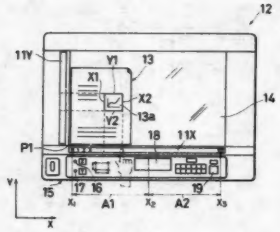
applied from the position detecting means when reference position is pressed by pressing the position pressing means;

region discriminating means for discriminating a region to which the pressed position belongs when the position detecting means is pressed;

control means for controlling the complementary operating means to perform complementary operation based on the reference points in the region to which the pressed position belongs, and

at least more than three reference points and the regions between the neighboring reference points being set into the position detecting means.

6. A position detector provided in a position input apparatus comprising:



a strip upper electrode operatively connected to a lead,

a strip lower electrode operatively connected to a wiring member, said lower electrode being disposed opposite said upper electrode and functioning to output an electrical signal of a level corresponding to a pressed position,

a grounded conductor located under the lower electrode; and,

the upper electrode and the lower electrode and said wiring member are all positioned inwardly of the periphery of the conductor at least by the distance equal to that from the upper surface of the upper electrode to the upper surface of the conductor.

4,989,041

OPTICAL SCANNING DEVICE FOR IMAGE FORMING APPARATUS

Tatsuyuki Miura, Yokohama, and Kazuhiro Ikemori, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 31, 1989, Ser. No. 304,208

Claims priority, application Japan, Feb. 18, 1988, 63-33916

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—235 **4 Claims**

1. An optical scanning device for an image forming apparatus including a document table on which an original document is placed, an image carrier, and carriage means moving in a first direction for transmitting reflected light from the original document onto the image carrier, and moving in a second direction, opposite to the first direction, and having a front portion and a rear end portion relative to the first direction, the device comprising:

a pair of rails.

a pair of first rollers rotatably fixed to the rear end portion of the carriage means to respectively roll on the upper surfaces of the pair of rails;

moving means for moving the carriage means in the first direction and the second direction along the rails; and

a pair of second rollers rotatably fixed to the rear end portion of the carriage means to respectively contact with the under surfaces of the pair of rails for deterring a force moment from occurring in the carriage means during movement of the carriage means in the first direction.

4,989,042

IMAGE SYNTHESIZING APPARATUS

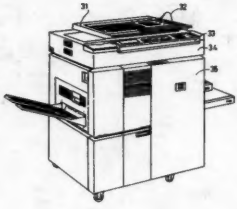
Masanori Muramatsu, Yokohama, and Takashi Sugiura, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

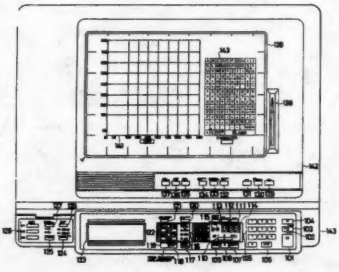
Continuation of Ser. No. 302,085, Jan. 26, 1989, abandoned, which is a continuation of Ser. No. 159,311, Feb. 23, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 378,482

Claims priority, application Japan, Feb. 26, 1987, 62-44347; Feb. 27, 1987, 62-44932; Feb. 27, 1987, 62-44944; Mar. 3, 1987, 62-47963

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—244 **52 Claims**





23. An image synthesizing apparatus comprising:

means for exposing an original;

means for generating pattern data;

means for setting a desired image processing mode in which an image of the original exposed by said exposing means is processed;

means for synthesizing the image of the original to be processed in the image processing mode set by said setting means and the pattern data generated by said generating means; and

control means for controlling the size or synthesis position of the pattern data to be synthesized by said synthesizing means according to the image processing mode set by said setting means.

4,989,043

COLOR-BALANCE CONTROL METHOD

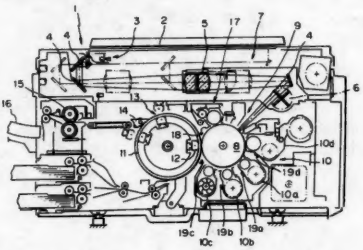
Koji Suzuki, Yokohama; Hajime Oyama, Ichikawa; Shinichi Namekata; Yuji Sawai, both of Yokohama, and Hideo Yoo, Tama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 4, 1989, Ser. No. 347,209

Claims priority, application Japan, May 9, 1988, 63-110570; May 9, 1988, 63-110571

Int. Cl.[5] G03G *21/00, 15/01*

U.S. Cl. 355—246 **3 Claims**



1. A color-balance control method for use in an image forming system which forms a full color image by overlapping images composed of three colors of Yellow, Magenta and Cyan by means of an electrophotographic method, comprising the steps of:

controlling an amount of a toner supplied in response to each of a plurality of outputs of toner density sensors within an entire developing means;

forming an unfixed toner image for each of the three colors onto a photosensitive element, each of the unfixed toner images corresponding to a high density image;

detecting the unfixed toner images by a photoelectric sensor which detects toner adhering amounts of the unfixed toner images; and

correcting each of outputs of said toner density sensors within said entire developing means in response to detected results of said photoelectric sensor where a color-balance with respect to the three colors is unbalanced upon detecting of said photoelectric sensor;

all outputs of said toner density sensors with respect to the three colors being corrected in response to a detected result of a reference color where all toner adhering amounts with respect to the three colors are within a predetermined allowable range upon detecting of said photoelectric sensor.

4,989,044

DEVELOPING APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

Katsuhiko Nishimura, Yokohama; Michihito Yamazaki, Tokyo; Keiji Okano, Yokohama; Motoi Katoh, Yokohama; Kouichi Suwa, Yokohama; Yasushi Sato, and Kimio Nakahata, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1989, Ser. No. 341,352

Claims priority, application Japan, Apr. 27, 1988, 63-106463; Apr. 28, 1988, 63-108803; Dec. 22, 1988, 63-322039

Int. Cl.[5] G03G *15/08*

U.S. Cl. 355—251 **28 Claims**

1. A developing apparatus for developing an electrostatic latent image, comprising:

a movable developer carrying member for carrying one component developer to a developing zone where said developer carrying member is opposed to a latent image bearing member for carrying the electrostatic latent image, said developer carrying member being effective to triboelectrically charge the developer to a polarity for developing the latent image;

a regulating member for regulating a thickness of a layer of the developer on said developer carrying member to a thickness smaller than a minimum clearance between said developer carrying member and the image bearing member; and

a voltage source for applying a developing bias voltage to said developer carrying member to transfer the developer

from said developer carrying member to said image bearing member;

wherein said carrying member is provided with an outer layer of resin material in which fine conductive particles containing fine carbon particles and fine graphite particles are dispersed, and wherein secondary particles formed by the resin material and the fine conductive particles are distributed at a surface of the outer layer to form a rough surface.

4,989,045

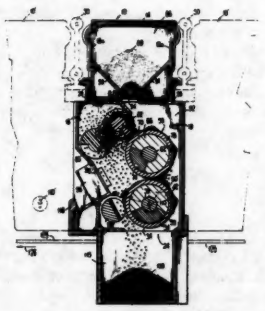
METHOD FOR REMOVAL AND ADDITION OF DEVELOPER TO A TONER MODULE IN AN ELECTROPHOTOGRAPHIC PRINT ENGINE

Danny L. Slayton, Lilburn; E. Neal Tompkins, Roswell; Khosrow Lak, Lawrenceville, all of Ga., and Charles S. Palm, Pasadena, Calif., assignors to Colorocs Corporation, Norcross, Ga.

Division of Ser. No. 28,972, Mar. 23, 1987, Pat. No. 4,848,267, which is a continuation-in-part of Ser. No. 791,218, Oct. 25, 1985, Pat. No. 4,652,115. This application May 1, 1989, Ser. No. 345,481

Int. Cl.[5] G03G *15/06, 21/00*

U.S. Cl. 355—260 **3 Claims**



1. A method of removing developer from an electrophotographic print engine toner module of the type including a developer opening and a carrying surface, a portion of said carrying surface extending through said developer opening in close proximity to a photoreceptor and over a plurality of magnetized pole pieces, comprising the step of:

(1) moving said toner module away from said photoreceptor;

(2) orientating said toner module so that said developer opening faces downwardly;

(3) moving said magnetized pole pieces away from said portion of said carrying surface so that substantially no magnetic force is present at said portion of said carrying surface; and

(4) rotating said carrying surface such that said developer will be carried to said portion of said carrying surface extending through said developer opening where substantially no magnetic force is present thereby allowing said developer to fall out of said module.

4,989,046

APPARATUS FOR FORMING COLOR IMAGES

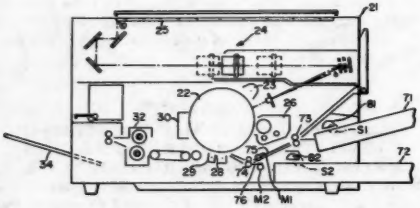
Hiroshi Matsuo, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 61,887, Jun. 12, 1987, abandoned. This application Aug. 4, 1989, Ser. No. 389,763

Claims priority, application Japan, Jun. 27, 1986, 61-151971; Jun. 27, 1986, 61-151972; Jun. 27, 1986, 61-151973; Jun. 27, 1986, 61-151974; Jun. 27, 1986, 61-151976

Int. Cl.[5] G03G *15/08*

U.S. Cl. 355—279 **5 Claims**



1. In an image forming apparatus for forming an image on a copy sheet by placing one on top of the other said copy sheet and a developer sheet having a base sheet with one surface thereof covered with a thermally fusible adhesive development layer, the improvement wherein said apparatus comprises

image transfer means for applying heat, pressure or both heat and pressure to said copy and developer sheets so as to cause selected portions of said development layer to stick to said copy sheet,

a plurality of sheet containers for selectively containing copy and developer sheets,

stacking means capable of causing one sheet each to be delivered from said plurality of sheet containers and stacking said delivered sheets together to form a stack, and

transporting means for transporting said stack to said image transfer means.

4,989,047

CLEANING APPARATUS FOR THE REDUCTION OF AGGLOMERATION-CAUSED SPOTTING

Don B. Jugle, Penfield; Nero R. Lindblad, Ontario, and Robert S. Pozniakas, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 11, 1989, Ser. No. 449,682

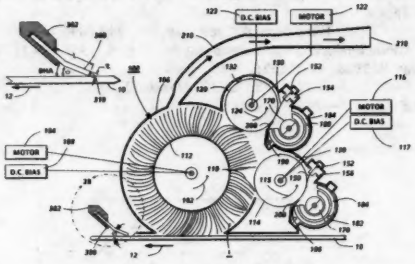
Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—297 **30 Claims**

1. Reproduction apparatus including a charge retentive surface; image forming means for forming a latent image on the charge retentive surface; developing means for developing the latent image with toner; transfer means for transferring the developed toner image from the charge retentive surface to a support surface; and cleaning means for removing residual toner and debris from the charge retentive surface, said cleaning means comprising:

a primary cleaner removing the predominant amount of residual toner and debris; and

an agglomerate cleaning blade, including a cleaning edge supported at a low angle of attack in engagement with the charge retentive surface at a relatively low load, for shearing release of spot causing agglomerate particles from the charge retentive surface.



4,989,048

CONTROL FOR RELEASING A CLEANING BLADE BASED ON THE PHOTOCONDUCTIVE ELEMENT TEMPERATURE

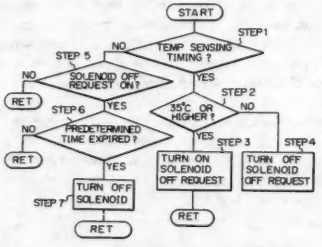
Makoto Arai, and Yuichi Aoyama, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 21, 1989, Ser. No. 326,512

Claims priority, application Japan, Apr. 6, 1988, 63-83114

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—299 **9 Claims**



1. A cleaning device for an image recorder having a photoconductive element and a cleaning blade which is movable and can be brought into pressing contact with a surface of said photoconductive element, comprising:

sensor means for sensing a temperature of said photoconductive element; and

control means for controlling, in response to a level of the sensed temperature, a period of time during which said cleaning blade is to be left in pressing contact with said photoconductive element after an image recording operation and such that said cleaning blade is maintained in pressing contact with said photoconductive element after an image recording operation if the sensed temperature is lower than at least one predetermined temperature, and to release said cleaning blade from said photoconductive element only upon lapse of a predetermined period of time after an image recording operation if the sensed temperature is equal to or higher than said predetermined temperature.

4,989,049

MULTI-COLOR IMAGE FORMING APPARATUS

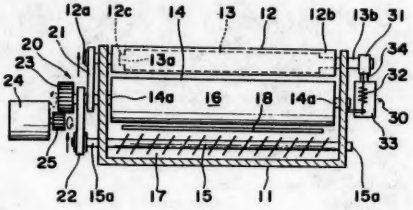
Yasuhiro Kusuda; Takafumi Tottori, and Masaru Komura, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

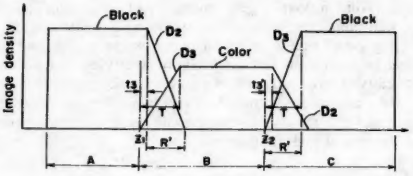
Continuation of Ser. No. 148,423, Jan. 25, 1988, abandoned. This application Aug. 14, 1989, Ser. No. 394,157

Claims priority, application Japan, Jan. 26, 1987, 62-15572; Jan. 28, 1987, 62-18846; Jan. 29, 1987, 62-21630

Int. Cl.[5] G03G *15/01, 15/06*

U.S. Cl. 355—326 10 Claims





1. A multi-color image forming apparatus comprising:

an original platform;

a photoreceptor;

a scanning means for scanning from a scanning start position towards a scanning completion position an original document placed on said original platform;

a designating means which is movable, in a direction of scanning of said scanning means along said original platform, at least between the scanning start position and the scanning completion position;

an image forming means which projects an image of the original document scanned by said scanning means, onto said photoreceptor so as to form a singular electrostatic latent image corresponding to the original document on said photoreceptor irrespective of the position of said designating means;

first and second developing means for developing the electrostatic latent image in first and second colors, respectively;

an input means for giving a command for starting copying of said multi-color image forming apparatus;

a starting means for starting operation of said scanning means, said image forming means and said first developing means in response to the command from said input means;

detecting means which detects that said scanning means has reached, during scanning by said scanning means, a position corresponding to said designating means;

first timer means responsive to said detecting means for starting a time count operation of a first predetermined time;

second timer means responsive to said detecting means for starting a time count operation of a second predetermined time; and

a first control means for stopping operation of said first developing means in response to the completion of time counting operation of said first timer means;

a second control means for starting operation of said second developing means in response to the completion of time counting operation of said second timer means;

whereby said singular electrostatic latent image is developed with first and second colors using a single scan of said scanning means.

4,989,050

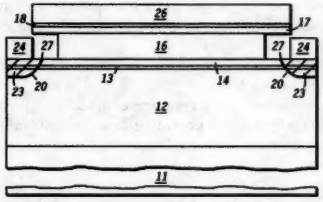
SELF ALIGNED, SUBSTRATE EMITTING LED

Craig A. Gaw, Scottsdale, and Curtis D. Moyer, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 28, 1989, Ser. No. 399,049

Int. Cl.[5] H01L *33/00*

U.S. Cl. 357—17 15 Claims



1. A light emitting semiconductor device comprising: a substrate having a first and a second surface wherein the substrate is substantially transparent to the emitted light and the first surface is compatible with epitaxial growth of a direct band gap semiconductor; a p-type AlGaAs layer covering the first surface of the substrate; a p-type InGaAs layer covering the p-type AlGaAs layer; a first n-type AlGaAs layer covering the p-type InGaAs layer; a second n-type AlGaAs layer covering a portion of the first n-type AlGaAs layer; an n-type GaAs layer covering the second n-type AlGaAs layer and having an overhanging portion which extends beyond the second n-type AlGaAs layer; an n-type InGaAs layer covering the n-type GaAs layer; and a p-type diffused region extending from a portion of an exposed surface of the first n-type AlGaAs layer, through the p-type InGaAs layer and into the P-type AlGaAs layer having a lateral boundary which is beneath the overhanging portion of the GaAs layer.

4,989,051

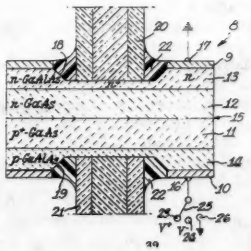
BI-DIRECTIONAL, FEED THROUGH EMITTER-DETECTOR FOR OPTICAL FIBER TRANSMISSION LINES

Thomas W. Whitehead, Raleigh, N.C.; Robert G. Hunsperger, Newark, and Garfield Simms, Dover, both of Del., assignors to The Univ. of Delaware, Newark; E. I. DuPont de Nemours & Co., Wilmington; both of Del.

Filed Feb. 13, 1990, Ser. No. 479,258

Int. Cl.[5] H01L *31/12*

U.S. Cl. 357—19 13 Claims



1. A unitary emitter-detector semiconductive diode device

with the capability of direct optical coupling at lateral surfaces of the diode device to optical transmission lines,

the device having means for coupling to electrical forward bias, and electrical reverse bias between an optical emitter mode, and an optical detector mode and contact means for coupling to external electrical circuits, having in combination

a heavily doped semiconductor active layer of one conductivity type,

one surface of said active layer forming a p-n junction with one surface of a coextensive lightly doped semiconducting layer of conductivity opposite to that of the active layer;

a first confining layer having a surface in contact with another surface of said active heavily doped semiconducting layer

a second confining layer having a surface in contact with another surface of said lightly doped semiconducting layer

a first optical waveguide coupled to the lateral surface of the first confining layer,

and a second optical waveguide coupled to the lateral surface of the second confining layer to transmit in both directions by direct coupling from lateral surfaces of said device

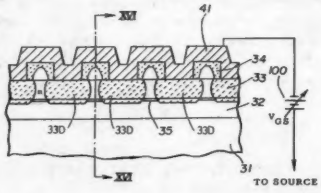
and indentations formed in opposing surfaces of said diode, said optical waveguides being respectively positioned in said indentations.

4,989,052

QUANTUM EFFECT SEMICONDUCTOR DEVICE

Makoto Okada, Yokohama, and Naoki Yokoyama, Atsugi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 17, 1988, Ser. No. 207,991
Claims priority, application Japan, Jun. 19, 1987, 62-151298
Int. Cl.[5] H01L *29/80*
U.S. Cl. 357—22 **18 Claims**



1. A quantum effect semiconductor device comprising:

a substrate;

a channel layer formed on said substrate and being a substantially non-doped semiconductor;

a doped carrier supplying layer formed on said channel layer and having a smaller electron affinity than said channel layer;

a doped cap layer formed on said doped carrier supplying layer in a form of an ultra-fine wire;

a gate electrode formed on said doped cap layer;

a source electrode and a drain electrode formed at both sides of said gate electrode;

a depletion region formed in said doped carrier supplying layer and extending to an interface between said channel layer and said doped carrier supplying layer, said depletion region not formed in a portion immediately under said doped cap layer; and

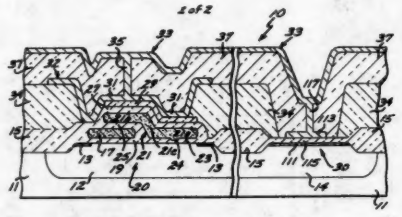
bias means for applying a voltage across said gate electrode and said source electrode, said voltage controlling a spreading of said depletion region therein controlling a width of a one-dimensional electron gas layer at a heterointerface on a side of said channel layer immediately under said doped cap layer.

4,989,053

NONVOLATILE PROCESS COMPATIBLE WITH A DIGITAL AND ANALOG DOUBLE LEVEL METAL MOS PROCESS

Everett K. Shelton, 3586 Windspun Dr., Huntington Beach, Calif. 92649

Filed Mar. 27, 1989, Ser. No. 329,051
Int. Cl.[5] H01L *29/68, 29/78, 23/48;* G11C *11/34*
U.S. Cl. 357—23.5 **6 Claims**



1. A non-volatile transistor structure comprising:

a semiconductor substrate;

a polysilicon access gate dielectrically separated from said substrate;

a polysilicon floating gate having (a) a first portion dielectrically separated from said substrate by a low leakage floating gate oxide layer and a tunnel oxide region, and (b) a second portion at least partially overlying and dielectrically separated from said polysilicon access gate by a low leakage interpoly dielectric layer; and

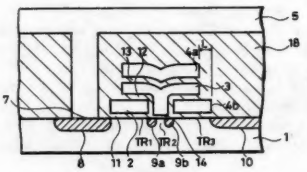
a metal control gate overlying and dielectrically separated from said floating gate.

4,989,054

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE USING CONTACT HOLE CONNECTION

Hideaki Arima, and Natsuo Ajika, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 17, 1989, Ser. No. 339,546
Claims priority, application Japan, Aug. 26, 1988, 63-213202
Int. Cl.[5] H01L *29/78*
U.S. Cl. 357—23.5 **11 Claims**



1. A non-volatile semiconductor memory device comprising:

a semiconductor substrate of a first conductivity type having a major surface; and

a plurality of memory transistors commmonly formed on said major surface of said semiconductor substrate and connected to a common source line, each of said plurality of memory transistors including:

first, second, and third impurity regions of a second conductivity type opposite said first conductivity type formed spaced apart on said major surface of said semiconductor substrate with a first prescribed space between said first and second impurity regions forming a first channel region and a second prescribed space between said second and third impurity regions defining a second channel region, said channel regions formed in portions of said major surface of said semiconductor substrate,

a first conductor formed on said second channel region through a first insulating film,

a second conductor formed on said first channel region through an insulating film and on said first conductor through a second insulating film, and

a third conductor formed on said second conductor through an insulating film and electrically connected to said first conductor through a contact hole formed in said second insulating film,

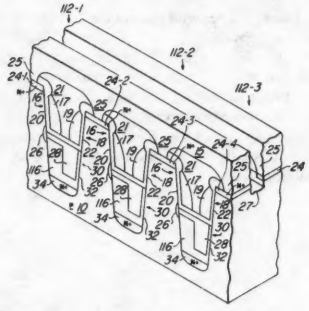
said third impurity region being connected to said common source line.

4,989,055

DYNAMIC RANDOM ACCESS MEMORY CELL

Donald J. Redwine, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 15, 1989, Ser. No. 366,561
Int. Cl.[5] H01L *29/78, 27/02*
U.S. Cl. 357—23.6 **10 Claims**



6. A random access memory comprising:

a plurality of memory cells formed in a regular array in a substrate, each cell comprising:

a trench formed in said substrate, said substrate having a first conductivity type;

a first doped region formed in said substrate at a surface of said trench having a second conductivity type opposite said first conductivity type;

a first channel region in said substrate at a surface of said trench, said first channel region being adjacent to said first doped region;

a first gate formed in said trench controlling the conductivity of said first channel region, said first gate conducter connected to a surface of said substrate;

a second doped region formed in said substrate at the intersection of said trench and a major surface of said substrate, said second doped region having said second conductivity;

a second channel region formed in said substrate at a surface of said trench, said second channel region being interposed between said second doped region and said first gate;

a second gate formed in said trench controlling the conductivity of said second channel region;

a third doped region formed in said substrate at an intersection between said trench and said major surface of said substrate, said third doped region being separated from said second doped region;

a third channel region formed in said substrate at a surface of said trench, said third channel region being interposed between said third doped region and said first gate; and

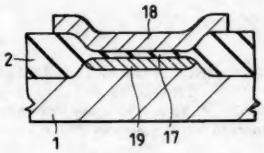
a third gate formed in said trench controlling the conductivity of said third channel region.

4,989,056

SEMICONDUCTOR CAPACITOR

Atsushi Hiraiwa, Kodaira; Shinpei Iijima, Akishima, and Jiro Yugami, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 10, 1989, Ser. No. 349,820
Claims priority, application Japan, May 16, 1988, 63-117140
Int. Cl.[5] H01L *29/68, 27/02, 27/01*
U.S. Cl. 357—23.6 **23 Claims**



1. A capacitor comprising a first electrode; an insulator formed on said first electrode; and a second electrode formed on said insulator,

wherein first and second semiconductor layers of p-type and n-type conductivity, respectively, are formed on the surface regions of said first and second electrodes at least on sides thereof adjacent to said insulator, said first and second semiconductor layers having an impurity doped concentration of 1×10^{19} cm^{-3} to 2×10^{21} cm^{-3},

wherein said insulator has a thickness of 2nm to 6nm in terms of a silicon dioxide equivalent and is disposed such that a pn junction is not effected between said first and second electrodes, and

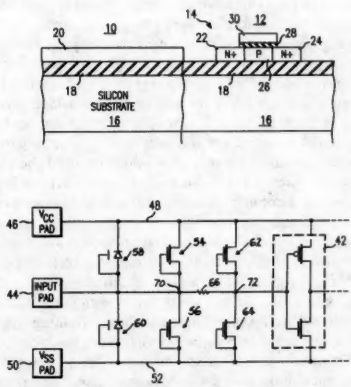
wherein said first electrode is to be applied with a relatively positive bias voltage with respect to a reference at said second electrode.

4,989,057

ESD PROTECTION FOR SOI CIRCUITS

Hsindao Lu, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 26, 1988, Ser. No. 199,217
Int. Cl.[5] H01L *27/01, 27/13, 29/78*
U.S. Cl. 357—23.7 **20 Claims**



1. An ESD protection device for use with semiconductor-on-insulator circuits, comprising:

a semiconductor-on-insulator structure including a semiconductor material adapted for forming transistors therein;

a conductor for carrying signals with respect to said transistor circuits; and

a field effect transistor connected to said conductor for carrying ESD currents, said transistor having a semiconductor body defining a conduction channel between a semiconductor drain and a semiconductor source, said semiconductor body being electrically isolated from other semiconductor bodies formed from the semiconductor-on-insulator structure.

4,989,058

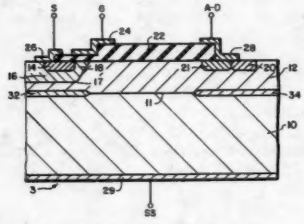
FAST SWITCHING LATERAL INSULATED GATE TRANSISTORS

Sel Colak, Ossining, N.Y., and Valdimir Rumennik, Los Altos, Calif., assignors to North American Philips Corp., New York, N.Y.

Continuation-in-part of Ser. No. 54,081, May 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 802,781, Nov. 27, 1985, abandoned. This application Nov. 22, 1988, Ser. No. 275,637

Int. Cl.[5] H01L *29/78, 27/02*

U.S. Cl. 357—23.8 **5 Claims**



1. A lateral insulated gate transistor having a semiconductor substrate of a first conductivity type, an epitaxial surface layer of a second conductivity type opposite to that of the first on a first major surface of said substrate, a surface-adjoining channel region of said first conductivity type in said epitaxial layer and forming a p-n junction therewith, a surface-adjoining source region of said second conductivity type in said channel region, a surface-adjoining drain region of said second conductivity type in said epitaxial layer and spaced apart from said channel region, a surface-adjoining anode region of said first conductivity type in said epitaxial layer, adjacent said drain region, and closer to said drain region than to said channel region, an insulating layer on said epitaxial surface layer and covering at least that portion of said channel region located between said source region and said drain region, a gate electrode on said insulating layer, over said portion of the channel region and electrically isolated from said surface layer, a source electrode connected to the source region of said transistor, a single anode-drain electrode connected to said anode region and coupled to said rain region, and a substrate electrode on a second major surface of said substrate opposite to the first, the product of doping concentrating and epitaxial layer thickness of said epitaxial layer being about 2×10^{12} atoms/cm^2, wherein said adjacent surface-adjoining drain and anode regions are side-by-side and in direct physical contact with each other, and wherein said anode-drain electrode directly contacts both said drain region and said anode region, and further comprising a first barrier layer of said first conductivity type located at the first major surface of said substrate and beneath said source and channel regions, and a second buried layer of said second conductivity type located at the first major surface of said substrate and beneath said anode and drain regions.

4,989,059

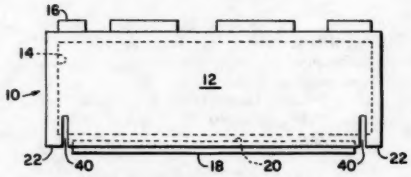
SOLAR CELL WITH TRENCH THROUGH PN JUNCTION

Ronald H. Micheels, Concord; Percy Valdivia, Cambridge, and Jack I. Hanoka, Brookline, all of Mass., assignors to Mobil Solar Energy Corporation, Billerica, Mass.

Division of Ser. No. 193,818, May 13, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 375,037

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **13 Claims**



1. A solid state semiconductor device formed by a method comprising the steps of:

(a) providing a silicon substrate having a front surface, a rear surface, and opposite side edge surfaces, and a preformed PN junction adjacent all of said surfaces; and

(b) using an excimer laser to ablate a trench through said PN junction along one of said front and rear surfaces so as to electrically isolate the junction at said front surface from the junction at said rear surface.

4,989,060

SOLID-STATE IMAGING DEVICE WITH PIXELS HAVING WEIGHTED SENSITIVITY DISTRIBUTION

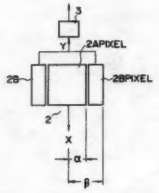
Yoshiko Usui, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 415,460, Oct. 2, 1989, abandoned, which is a continuation of Ser. No. 113,067, Oct. 27, 1987, abandoned. This application Jun. 22, 1990, Ser. No. 541,192

Claims priority, application Japan, Oct. 29, 1986, 61-255758

Int. Cl.[5] H01L *27/14, 31/00, 29/78;* **H01J** *40/14*

U.S. Cl. 357—30 **5 Claims**



1. A solid-state imaging device comprising:

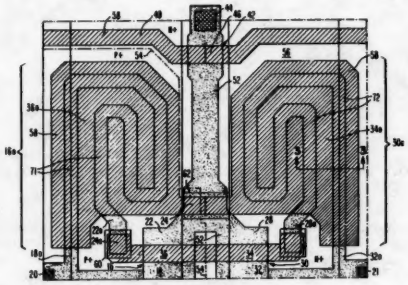
a pixel having a main area and a sub-area positioned adjacent said main area, each area producing an output signal; and

a processing circuit for (1) receiving the output signals from said main area and said sub-area, (2) suppressing an intensity of the sub-area output signal, (3) inverting a polarity of the sub-area output signal, and (4) combining the suppressed and inverted sub-area output signal with the main area output signal to provide a pixel output signal having enhanced sensitivity.

4,989,061
RADIATION HARD MEMORY CELL STRUCTURE WITH DRAIN SHIELDING

Roger G. Stewart, Hillsborough Township, Somerset County, and Dora Plus, South Bound Brook, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 5, 1986, Ser. No. 904,271
Int. Cl.[5] H01L 27/02, 29/04, 29/06, 27/01
U.S. Cl. 357—41 8 Claims

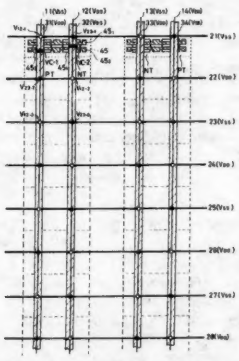


1. A memory cell structure comprising:
first and second cross-coupled inverters, each inverter comprising first and second series-coupled MOS transistors;
each of said transistors of said second inverter comprising a source, disposed near the periphery of the cell, and a drain; and
means for shielding said drains including a serpentine-shaped channel region coupled between said drain and said source.

4,989,062
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING MULTILAYER POWER SUPPLY LINES

Hiromasa Takahashi, Ebina; Kazuyuki Kawauchi, and Shigeru Fujii, both of Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 16, 1988, Ser. No. 207,488
Claims priority, application Japan, Jun. 19, 1987, 62-154009
Int. Cl.[5] H01L 27/10, 23/48, 29/34
U.S. Cl. 357—45 7 Claims

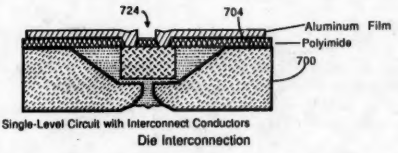


1. A semiconductor integrated circuit device having multilayer power supply lines comprising:
a semiconductor chip in which an integrated circuit is formed;
a first insulating layer formed on the semiconductor chip;
a plurality of first power supply lines formed by a first conductive layer formed on the first insulating layer, the first power supply lines being arranged so as to extend in parallel in a first direction, the first power supply lines comprising a first group for supplying the integrated circuit with a first power source voltage and a second group for supplying the integrated circuit with a second power source voltage;
a second insulating layer formed on the first conductive layer;
a plurality of second power supply lines formed by a second conductive layer formed on the second insulating layer, the second power supply lines being arranged so as to extend in parallel in a second direction perpendicular to the first direction, the second power supply lines comprising a first group for supplying the integrated circuit with the first power source voltage and a second group for supplying the integrated circuit with the second power source voltage;
a third insulating layer formed on the second conductive layer;
a plurality of third power supply lines formed by a third conductive layer formed on the third insulating film, each of the third power supply lines extending so as to overlap a corresponding one of said first power supply lines, and supplying the integrated circuit with the power source voltage different from that of said corresponding one of said first power supply lines,
said plurality of second power supply lines crossing said plurality of first power supply lines through said first insulating layer and crossing the plurality of third power supply lines through said third insulating layer;
a first electrical contact formed at an intersecting point where one of the first power supply lines and one of the second power supply lines, having a potential identical to said one of the first power supply lines, cross through said second insulating layer; and
a second electrical contact formed at an intersecting point where one of the second power supply lines and one of the third power supply lines, having a potential identical to said one of the second power supply lines, cross through said third insulating layer.

4,989,063
HYBRID WAFER SCALE MICROCIRCUIT INTEGRATION

Edward S. Kolesar, Jr., Beavercreek, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation of Ser. No. 282,423, Dec. 9, 1988, abandoned. This application Apr. 24, 1990, Ser. No. 549,672
Int. Cl.[5] H01L 27/02, 27/22, 29/34, 29/06
U.S. Cl. 357—54 26 Claims



1. A wafer scale integration multiple die integrated circuit structure comprising the combination of:
a semiconductor wafer host member having top and bottom planar surfaces;
a plurality of receptacle wells each having lateral and bottom surfaces received in selected top surface locations of said wafer;
a plurality of integrated circuit die, each die including a planar top surface having a plurality of electrical connection bonding pads adjacent thereto, a bottom surface, and lateral surfaces joining said top and bottom surfaces, said

die being uprightly received one in each of said wafer member receptacle wells with said die top surface and said wafer surface being disposed in substantial planar alignment by the die bottom surface to receptacle well bottom surface thickness of interstitial cured epoxy adhesive means;

cured epoxy adhesive means, including a predetermined thermal coefficient of expansion selective particulate filler material uniformly dispersed therein, received in each of said receptacle wells intermediate each respective of said well and die bottom surfaces and said well and die lateral surfaces for physically connecting said die and wafer elements, said adhesive means also including an annularly disposed and planar surface aligned top surface portion bridging between the planar surfaces of said die and wafer.

4,989,064

ALUMINUM ALLOY LINE RESISTIVE TO STRESS MIGRATION FORMED IN SEMICONDUCTOR INTEGRATED CIRCUIT

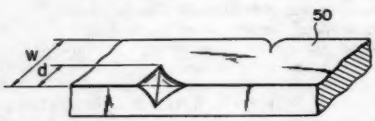
Ryoichi Kubokoya, Anjo; Yasushi Higuchi, Kariya, and Kazunori Kawamoto, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Japan

Continuation of Ser. No. 100,277, Sep. 23, 1987, abandoned. This application Jul. 5, 1989, Ser. No. 376,144

Claims priority, application Japan, Dec. 17, 1986, 61-300725

Int. Cl.[5] H01L *23/48, 29/46, 29/62, 29/64*

U.S. Cl. 357—67 **25 Claims**



1. An aluminum alloy connecting means of a type which has resistance to stress migration formed in a semiconductor integrated circuit, comprising:

an insulating layer formed on a semiconductor substrate wherein circuit devices are constructed;

an alloy line layer which includes crystal grains, each of which has crystal faces, and comprising aluminum as a constituent of the alloy and formed on said insulating layer such that the crystal faces of the crystal grains of said alloy line layer are mainly oriented in the (111) plane, and the grain size of the crystal being regulated so as to satisfy the following relationship:

$$(W/14)<l<W$$

where l is the grain size of the alloy crystal, and W is the line width; and

a protection film of a type which has internal stresses therein, protecting at least said alloy line layer and formed on or above at least part of said alloy line layer so that said internal stresses of the protection film acts thereon, wherein an occurrence of stress migration due to the tensile stress of said protection film is prevented.

4,989,065

HEAT-RESISTANT OHMIC ELECTRODE

Junichi Tsuchimoto; Tooru Yamada, both of Yokohama, and Takaya Miyano, Kobe, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Hyogo, Japan

Filed Jun. 13, 1989, Ser. No. 365,521

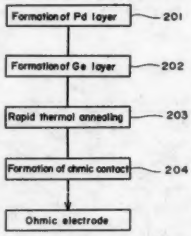
Claims priority, application Japan, Jun. 13, 1988, 63-144996; Dec. 23, 1988, 63-325485

Int. Cl.[5] H01L *21/285*

U.S. Cl. 357—67 **12 Claims**

1. An ohmic electrode providing an ohmic contact, said electrode comprising palladium and germanium and said electrode being formed by

providing a Pd layer having a thickness between 300 Å and 1500 Å directly onto a n-type GaAs semiconductor crystal,



providing a Ge layer having a thickness between 500 Å and 1500 Å on the Pd layer, and

conducting a rapid thermal annealing treatment whereby said electrode continues to exhibit ohmic characteristics when it is kept in high temperature conditions at 300° C. for at least 100 hours.

4,989,066

SEMICONDUCTOR PACKAGE

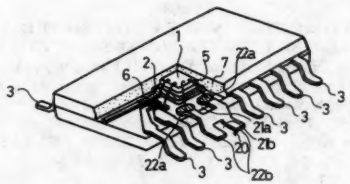
Noriaki Sumi, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1990, Ser. No. 468,612

Claims priority, application Japan, Jan. 26, 1989, 1-8059

Int. Cl.[5] H01L *23/48, 23/54*

U.S. Cl. 357—68 **24 Claims**



1. A semiconductor component comprising:

a semiconductor chip;

a package for housing said semiconductor chip;

a signal lead projecting from said package; and

a feed lead projecting from said package, said feed lead having a pair of recesses to form two pairs of legs and a first portion not including said recesses disposed between said pairs of legs, wherein at least one of said pairs of legs extends from said package, and wherein said first portion is disposed outside of said package.

4,989,067

HYBRID INTERCONNECTION STRUCTURE

Milton L. Noble, Liverpool; Albert F. Milton, Syracuse; Darrel W. Endres, and Douglas W. Dietz, both of Liverpool, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Jul. 3, 1989, Ser. No. 374,932

Int. Cl.[5] H01L *23/48, 29/44, 29/52, 29/60*

U.S. Cl. 357—69 **14 Claims**

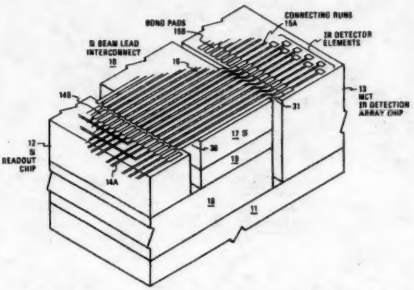
1. A hybrid interconnection structure comprising in combination:

(A) a substrate;

(B) a first semiconductor chip having its undersurface supported upon said substrate, and having on its upper surface an integrated circuit and near an edge of said upper surface a first plurality of closely spaced terminals;

(C) a second semiconductor chip having its undersurface supported upon said substrate at a position spaced from said chip and having on its upper surface an integrated circuit and near an edge of said upper surface a second plurality of closely spaced terminals oriented for sequential connection to said first plurality of terminals; and

(D) a beam lead interconnect comprising a third chip of semiconductor material having its undersurface supported upon said substrate and having on its upper surface a



plurality of patterned conductor runs maintained in rigid, mutually spaced relation, each conductor run extending beyond the edges of said third chip to form a first and a second beam lead of sufficient length for bonding to a terminal on an adjacent chip,

said interconnect being supported upon said substrate at a position between said first and second chips with said beam leads and terminals in registration and in mutually bonded condition to sequentially interconnect said first and second pluralities of terminals.

4,989,068

SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

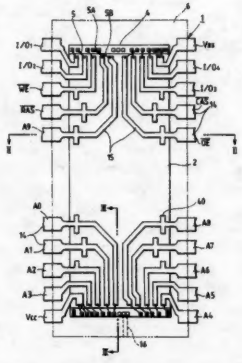
Toshihiro Yasuhara, Kokubunji; Masachika Masuda, Kodaira, and Gen Murakami, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 6, 1989, Ser. No. 306,398

Claims priority, application Japan, Feb. 12, 1988, 63-30111

Int. Cl.[5] H01L *23/52, 23/48, 23/28*

U.S. Cl. 357—72 **45 Claims**



1. A semiconductor device comprising;

a semiconductor chip having the shape of an elongated rectangle and having a principal surface which is formed with circuits and external terminals;

an insulator sheet which is bonded on the principal surface of said semiconductor chip;

a plurality of leads which are disposed on said insulator sheet and which are above said principal surface of said semiconductor chip, each one of said plurality of leads including an inner lead portion and an outer lead portion, each of said inner lead portions having a front end, and a part of each of said inner lead portions which is provided above said principal surface of said semiconductor chip having a width smaller than the width of said outer lead portions;

pieces of metallic fine wire which electrically connect said external terminals and the front ends of said inner lead portions; and

a sealing member which encapsulates said semiconductor chip, said insulator sheet, said inner lead portions and the metallic fine wire pieces;

wherein said external terminals are arranged on the shorter sides of said rectangular shaped semiconductor chip, and the front ends of said inner lead portions are disposed near the corresponding external terminals which are to be connected thereto.

4,989,069

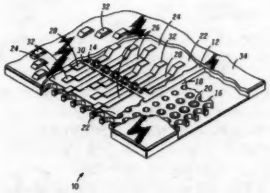
SEMICONDUCTOR PACKAGE HAVING LEADS THAT BREAK-AWAY FROM SUPPORTS

George W. Hawkins, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 29, 1990, Ser. No. 471,470

Int. Cl.[5] H01L *23/48, 23/54*

U.S. Cl. 357—74 **15 Claims**



1. A semiconductor package comprising:

a semiconductor device;

packaging material being disposed about said semiconductor device; and

a plurality of leads having first portions electrically coupled to said semiconductor device, said plurality of leads further extending from said packaging material and at least some of said plurality of leads having second portions adhered to the outside of said packaging material so that they will release from said packaging material when subjected to a predetermined stress.

4,989,070

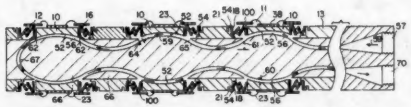
MODULAR HEAT SINK STRUCTURE

Arthur H. Iversen, Saratoga, and Stephan Whitaker, Davis, both of Calif., assignors to Coriolis Corporation, Saratoga, Calif.

Filed Nov. 10, 1988, Ser. No. 269,882

Int. Cl.[5] F28F *13/00;* **H01L** *23/34*

U.S. Cl. 357—82 **12 Claims**



1. A heat transfer apparatus comprising a heat exchange surface and an opposing heated surface which is exposed to a

heat flux, said heat exchange surface being exposed to a flow of nucleate boiling liquid, said heat exchange surface having nucleate boiling cavity sites disposed thereon, said nucleate boiling cavity sites including means for creating curved streamlines over said nucleate boiling cavity sites, said curved streamlines creating a zone of reduced pressure at said cavities thereby lowering the initiating superheat required to induce nucleate boiling at said nucleate boiling cavity sites.

4,989,071

METHOD OF PREPARING A HOLOGRAM USING READILY AVAILABLE LIGHT SOURCES

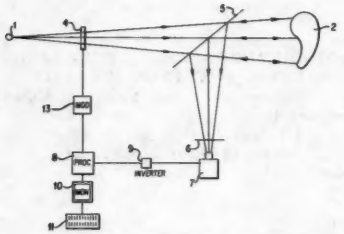
Anthony I. Hopwood, Macclesfield, England, assignor to Ilford Limited, Cheshire, England

Filed Mar. 23, 1989, Ser. No. 327,995

Claims priority, application United Kingdom, Mar. 24, 1988, 8807030

Int. Cl.[5] H04N *15/00*

U.S. Cl. 358—2 **13 Claims**



1. A method of preparing a color-separated holographic master for use in the preparation of a colored hologram of an object, comprising the steps of:

illuminating the object with red light, green light, and blue light obtained from incident specular white-light using alternately a blue filter, a green filter and a red filter respectively;

capturing, as each illumination is performed, reflectance values of the object using a detector placed as if it were along the axis of a laser to be used for holographic exposure and storing these reflectance values to produce a blue record, a green record and a red record as a positive image;

carrying out a holographic exposure of the object onto holographic material using the laser, with the positive image of the captured reflectance values being present in the object beam between the laser and the object as a light modulating means; and,

processing the holographic material to fix holographic fringes therein.

4,989,072

APPARATUS FOR TESTING AND ADJUSTING COLOR CATHODE RAY TUBE EQUIPMENT

Satoshi Sato, Kanagawa, and Hiroshi Ichigaya, Saitama, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 29, 1990, Ser. No. 472,615

Claims priority, application Japan, Jan. 31, 1989, 1-22293; Jan. 31, 1989, 1-22294; Feb. 8, 1989, 1-28974; Feb. 13, 1989, 1-33383; Feb. 17, 1989, 1-83039; Apr. 14, 1989, 1-94426

Int. Cl.[5] H04N *17/04*

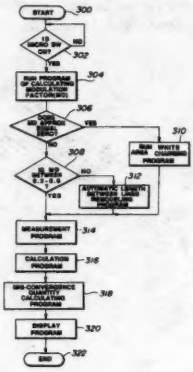
U.S. Cl. 358—10 **16 Claims**

1. An adjusting apparatus for cathode ray tube equipment, comprising:

(a) a pattern generator, which generates a predetermined pattern including bars and a white area, is connected to a cathode ray tube under test;

(b) a probe attached to a front face of the cathode ray tube under test and which comprises a switch for starting measurement and a photo detector for reading the light intensity of the CRT screen at the position of the probe and outputting a corresponding data signal;

(c) measured data memory means connected to receive the output data signal of the probe for memorizing the data received from the probe; and



(d) processor means which controls the pattern generator, receives data from the measured data memory, and calculates measurement data therefrom.

4,989,073

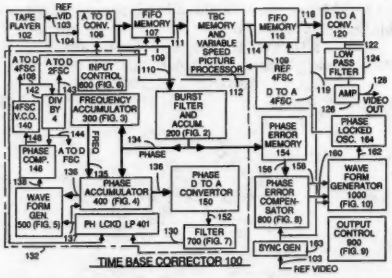
SYSTEM FOR COMPENSATING TIMING ERRORS DURING SAMPLING OF SIGNALS

Steven D. Wagner, Belmont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Continuation of Ser. No. 125,508, Nov. 25, 1987, abandoned. This application Dec. 28, 1988, Ser. No. 291,331

Int. Cl.[5] H04N *9/89*

U.S. Cl. 358—19 **25 Claims**


TAPE PLAYER 102
REF VID 103
A TO D CONV. 106
FIFO MEMORY 107
TBC MEMORY AND VARIABLE SPEED PICTURE PROCESSOR
FIFO MEMORY 116
D TO A CONV. 120
LOW PASS FILTER
AMP
VIDEO OUT
INPUT CONTROL 300 (FIG. 6)
FREQUENCY ACCUMULATOR 300 (FIG. 3)
DIV BY 4
BURST FILTER AND ACCUM. 200 (FIG. 2)
D TO A 4FSC
REF 4FSC
PHASE ERROR MEMORY 154
PHASE LOCKED OSC. 164
PHASE COMP. 146
PHASE ACCUMULATOR 400 (FIG. 4)
PHASE D TO A CONVERTOR 150
PHASE ERROR COMPENSATOR 800 (FIG. 8)
WAVE FORM GENERATOR 1000 (FIG. 10)
WAVE FORM GEN. 500 (FIG. 5)
PH LCKD LP 401
FILTER 700 (FIG. 7)
OUTPUT CONTROL 900 (FIG. 9)
SYNC GEN
TIME BASE CORRECTOR 100
REF VIDEO

1. A system for correcting timing errors in a video signal which includes colorburst signals and horizontal lines, and which is passed through an analog-to-digital convertor operating generally in synchronism with the video signal and through a digital-to-analog convertor for operating in general synchronism with a stable reference signal, comprising:

means receiving said video signal for generating a first clock signal that is generally synchronized with the color burst of the incoming video signal;

phase error measurement means responsive to digital values from the analog-to-digital convertor for measuring digitally during the color burst signal any phase error between the video signal and the first clock signal of said analog-to-digital convertor, and for supplying digital phase error values indicative of the magnitude of any error;

first digital phase error correction means responsive to said

phase error measurement means and to said generating means, for digitally providing said first clock signal whose phase is adjusted during the color burst signal in response to the magnitude of said phase error values, to sample the video signal in phase with the color burst signal;

phase error storage means for storing and supplying a plurality of said phase error values during respective horizontal lines of the video signal; and

second digital phase error correction means responsive to said phase error storage means for digitally supplying to said digital-to-analog convertor a second clock signal in phase with said stable reference signal at the start of each horizontal line, said second clock signal being shifted in phase relative to said stable reference signal during the line in response to said phase error values.

4,989,074

DIGITAL AUTOMATIC GAIN CONTROL APPARATUS

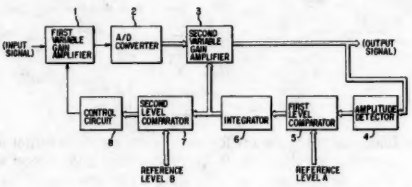
Tokikazu Matsumoto, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 21, 1989, Ser. No. 410,261

Claims priority, application Japan, Sep. 27, 1988, 63-241324; Sep. 27, 1988, 63-241326

Int. Cl.[5] H04N *9/64, 5/52;* **H04B** *1/06, 7/00*

U.S. Cl. 358—21 R **10 Claims**



1. A digital automatic gain control apparatus comprising:

a first variable gain amplifier for varying the amplitude of an input signal;

an A-D converter for converting the analog output signal of said first variable gain amplifier into digital form;

a second variable gain amplifier for varying the amplitude of the output signal of the A-D converter;

an amplitude detector for detecting the amplitude of the output signal of said second variable gain amplifier;

a first level comparator for comparing the output of said amplitude detector with a first reference value and outputting the difference;

an integrator for integrating the output of said first level comparator and controlling said second gain amplifier;

a second level comparator for comparing the output of said integrator with a second reference value and outputting the difference; and

a control circuit for controlling said first variable gain amplifier according to the output of said second level comparator.

4,989,075

SOLID-STATE IMAGE SENSOR DEVICE

Yukinobu Ito, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 370,074, Jun. 23, 1989, abandoned, which is a continuation of Ser. No. 236,390, Aug. 24, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 517,385

Claims priority, application Japan, Aug. 26, 1987, 62-210284

Int. Cl.[5] H04N *9/04*

U.S. Cl. 358—41 **19 Claims**

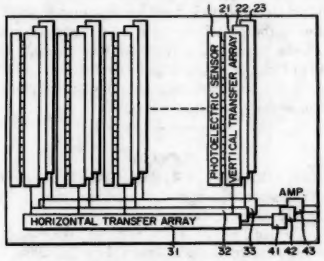
1. A solid-state image sensing device comprising:

a plurality of photoelectric conversion members disposed in parallel with each other for converting incident optical images to image signals;

a plurality of vertical transfer members for storing image signals which are output from corresponding photoelectric conversion members and transferring the stored image signals in the vertical direction; and

a plurality of horizontal transfer members coupled to said vertical transfer members for storing image signals transferred from vertical transfer members and transferring the stored image signals in the horizontal direction for each of scanning lines;

wherein each of said photoelectric conversion members comprises a photoelectric image sensor for periodically



and sequentially providing R, G and B image signals; each of said vertical transfer members comprises three vertical transfer arrays for storing R, G and B image signals, respectively, which are sequentially output from a corresponding photoelectric image sensor and transferring the stored image signals in the vertical direction; and said horizontal transfer members comprise three vertical transfer arrays for storing the R, G and B image signals, respectively, transferred from corresponding vertical transfer arrays and transferring the stored image signals in the horizontal direction.

4,989,076

VIDEO PROJECTION APPARATUS

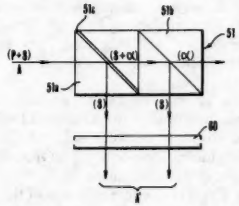
Mitsuru Owada, Kanagawa; Mizuho Tajima, Tokyo, and Yoshitake Nagashima, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 147,519

Claims priority, application Japan, Jan. 27, 1987, 62-017830; Jan. 27, 1987, 62-017831; Jan. 27, 1987, 62-015291

Int. Cl.[5] H04N *9/31*

U.S. Cl. 358—61 **15 Claims**



1. An apparatus, receiving a polarized light, for providing a color image on a projection lens, comprising:

(a) first, second and third display device for modulating incident light in response to a video signal to display respective component images;

(b) a first dichroic layer for separating the polarized light into a first light component and a first mixed light of different wavelength regions from each other and for providing said first light component to said first display device;

(c) a second dichroic layer for separating said first mixed light into second and third light components of different

wavelength regions from each other, and for providing said second and said third light components to said second and third display devices, respectively;

(d) a third dichroic layer for synthesizing first and second information lights from said first and second display devices; and

(e) a fourth dichroic layer for further synthesizing the light synthesized by said third dichroic layer with a third information light from said third display device; and

wherein said first, second, third, and fourth dichroic layers extend parallel to each other, and wherein said first dichroic layer separates the polarized light after it passes through an optical element for rotating a plane of polarization of the polarizing light by 90° and generates a first polarizing beam which does not pass through the optical element and a second polarized beam which passes through the optical element and has a same plane of polarization as the first polarized beam.

4,989,077

PHOTOGRAPHIC PRINTER WITH MONITOR

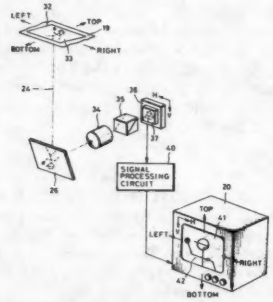
Takashi Yamamoto, Kanagawa, Japan, assignor to Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 27, 1989, Ser. No. 315,868

Claims priority, application Japan, Feb. 26, 1988, 63-43452

Int. Cl.[5] G03F *3/10*; H04N *7/18*; G03B *13/24*

U.S. Cl. 358—76 **8 Claims**



1. A photographic printer, having a printing optical path, for printing an original image, recorded in the emulsion layers of a photographic film on photosensitive emulsion layers of photosensitive material, said photographic film being placed with the emulsion layers down, said photographic printer comprising:

a light source for transmitting light;

reflecting means for reflecting said light passing through said printing optical path perpendicularly to the printing optical path;

imaging means having a read start position in an upper right hand corner thereof as viewed from said reflecting means;

a lens system disposed between said reflecting means and said imaging means so as to form an image of the original image on the imaging means; and

a monitor for displaying a screen image of the original image on a screen thereof, said screen image coinciding with the original image in directional relation.

4,989,078

STILL VIDEO CAMERA FOR RECORDING STEREO IMAGES ON A VIDEO DISK

K. Bradley Paxton, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 15, 1988, Ser. No. 232,249

Int. Cl.[5] H04N *13/00, 5/76*

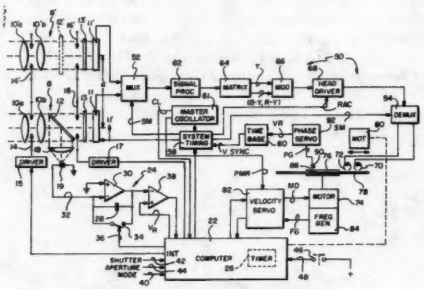
U.S. Cl. 358—88 **4 Claims**

1. A still video camera for recording a stereo image of a subject on a video disk as separate video fields, said video disk including a phase indicator in a hub region thereof for defining the beginning of a field relative to a track on the disk; said still video camera comprising:

a first image sensor for sensing the subject and generating a first video signal corresponding to the first field of the image;

a second image sensor for sensing the subject and generating a second video signal corresponding to the second field of the image, said second sensor displaced from said first sensor by a distance corresponding to the interocular separation of a human observer in order to produce a stereo effect in the respective video signals;

means for simultaneously exposing said first and second image sensors to the subject, thereby producing simultaneously-exposed first and second still video signals;



signal processing means for generating respective first and second recording signals from said first and second still video signals, said first recording signal corresponding to the first field of the image and said second recording signal corresponding to the second field of the image;

means for rotating the video disk;

means for sensing the phase indicator on the rotating video disk and generating a phase signal therefrom;

first recording means for recording the first recording signal on a first circular track on the video disk;

second recording means for recording the second video signal on a second circular track that is concentric to said first track on the same disk side thereof; and

timing means responsive to the occurrence of said phase signal for applying said first and second recording signals to said first and second recording means to record said first and second video fields in concentric tracks as a stereo field pair.

4,989,079

COLOR CORRECTION DEVICE AND METHOD HAVING A HUE AREA JUDGEMENT UNIT

Takanori Ito, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,277

Claims priority, application Japan, Oct. 23, 1987, 62-267942; Jun. 2, 1988, 63-135833

Int. Cl.[5] H04N *1/46*; G03F *3/08*

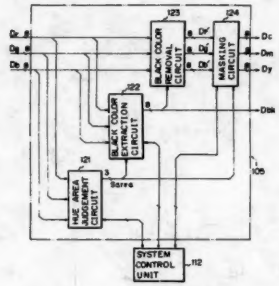
U.S. Cl. 358—80 **47 Claims**

1. A color correction device for correcting input image signals of basic colors, representative of color-separated input images, to produce output image signals of other basic colors, representative of output images for printing, said device comprising:

an input means for receiving information of colors related to the input images and to the output images;

a hue area judgement means for judging to which hue area among at least three predetermined hue areas the hue represented by said input image signals belongs:

a parameter setting means for setting color correction parameters in accordance with the received information by said input means and with the hue area judged by said hue area judgment means; and



a color conversion means for converting said input image signals to the output image signals by using said set color correction parameters, so that the input image signals are corrected in accordance with the hue area judged with respect to the same input image signals.

4,989,080

COLOR CORRECTION DEVICE WITH A HUE AREA JUDGMENT UNIT TO DETERMINE CORRECTION PARAMETERS

Takanori Ito, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

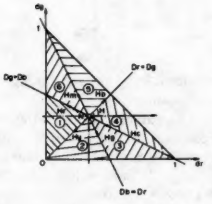
Filed Mar. 7, 1989, Ser. No. 319,722

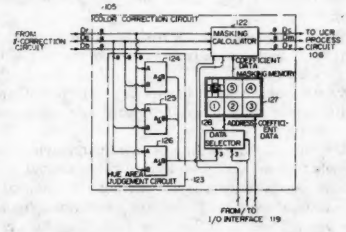
Claims priority, application Japan, Mar. 8, 1988, 63-54188

The portion of the term of this patent subsequent to Jan. 29, 2008, has been disclaimed.

Int. Cl.[5] H04N *1/46*; G03F *3/08*

U.S. Cl. 358—80 **6 Claims**





1. A color correction device for correcting input image signals of basic colors, representative of colorseparated input images, to produce output image signals of other basic colors, representative of output images for printing, said device comprising:

a hue area judgement means having a plurality of comparators for comparing the input image signals with each other so as to judge to which hue area among at least three predetermined hue areas the hue represented by said input image signals belongs;

a parameter setting means for setting color correction parameters in accordance with the hue area judged by said hue area judgement means; and

a color conversion means for converting said input image signals to the output image signals by using said set color correction parameters, so that the input image signals are corrected in accordance with the hue area judged with respect to the same input image signals.

4,989,081

HOME-BUS-INFORMATION SYSTEM

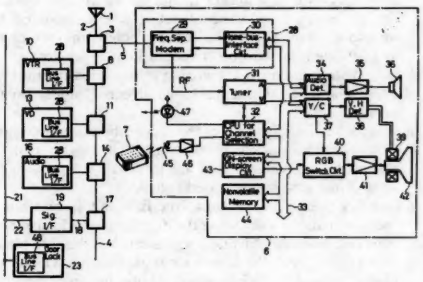
Masayuki Miyagawa, Chiba; Takao Itabashi; Hisafumi Yamada, both of Tokyo, and Yoshio Osakabe, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 9, 1989, Ser. No. 435,202

Claims priority, application Japan, Nov. 14, 1988, 63-287195; Jun. 8, 1989, 1-145657

Int. Cl.[5] H04N *7/18*

U.S. Cl. 358—93 **18 Claims**



1. A home-bus-information display system comprising:

(a) a video monitor having a picture screen;

(b) a signal source for supplying a video program;

(c) a plurality of home apparatus to be controlled electrically; and

(d) electrically controlling means provided in each of the plurality of home apparatus; characterized in the combination of

(e) a bus-line connected between the video monitor and each of the plurality of home apparatus;

(f) information means provided in each of the plurality of home apparatus for generating a distinctive status information signal in response to the electrically controlling means and for transmitting the status information signal to the video monitor through the bus-line; and

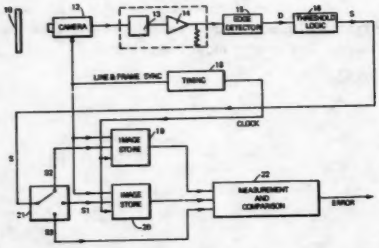
(g) display means responsive to the video program and the status information for displaying the status information additively to the video program on the picture screen of the video monitor.

4,989,082

IMAGE PROCESSING SYSTEM FOR COMPARING A TEST ARTICLE WITH A MASTER ARTICLE TO DETERMINE THAT AN OBJECT IS CORRECTLY LOCATED ON THE TEST ARTICLE

Brian M. Hopkins, Mahonburg, Ireland, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 26, 1989, Ser. No. 385,749
Claims priority, application Ireland, Jul. 29, 1988, 2350/88
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—101 8 Claims



1. An image processing system for inspecting an article under test to determine whether at least one selected object is correctly located on the article, the system comprising:

raster scan means for line-by-line scanning the article to generate a video signal corresponding to an image of the article,

threshold logic for converting the video signal into a first binary video signal in which the at least one selected object on the article is represented by a first logic level and non-selected objects and background are represented by a second logic level,

a first storage means for storing a second binary video signal corresponding to a master image of the article in which the at least one selected object is not represented but instead in which the region of the article within which the at least one selected object should lie is represented,

a second storage means for storing information defining the correct area of the at least one selected object on the article,

means for reading the lines of the second binary video signal from the first storage means such that the lines of the second binary video signal are in synchronism with the lines of the first binary video signal,

measuring means responsive to the first and second binary video signals for measuring the degree of overlap of the at least one selected object, as represented in the first binary video signal, with the respective region within which such object should lie, as represented in the second binary video signal, and

comparison means for comparing the measured degree of overlap of the at lest one selected object as determined by the measuring means with the correct area of such object as defined by the information in the second storage means.

4,989,083

METHOD OF INSPECTING OBJECTS BY IMAGE PICKUP MEANS

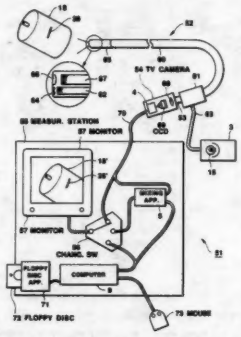
Teruo Eino, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1990, Ser. No. 468,673
Claims priority, application Japan, Jun. 29, 1989, 1-167649; Oct. 30, 1989, 1-283497
Int. Cl.[5] A61B 1/04, 1/06
U.S. Cl. 358—107 28 Claims

1. A method of inspecting objects by an image pickup means, comprising:

a first process in which an object picture obtained by imaging an object by an image pickup means is displayed on a screen of a monitor;

a second process in which a computer-graphics picture simulating said object is displayed on the screen of said monitor or a screen of another monitor; and



a third process in which said computer-graphics picture is approximated to said object picture by varying drawing parameters used in said computer-graphics picture.

4,989,084

AIRPORT RUNWAY MONITORING SYSTEM

Donald C. Wetzel, 65 Jacqueline Dr., Berea, Ohio 44017

Filed Nov. 24, 1989, Ser. No. 440,773
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—108 14 Claims

1. A system for monitoring aircraft taking off and landing on an airport runway, comprising:

at least four video cameras located adjacent to the runway, each of the cameras being trained at a different portion of the runway, each of the video cameras adapted for transmitting video signals, said video cameras including:

a first video camera located adjacent one end of the runway and generally along the longitudinal axis of the runway,

a second video camera located adjacent the other end of the runway and generally along the longitudinal axis of the runway,

a third video camera located adjacent one side of the runway and generally toward said one end of the runway, and

a fourth video camera located adjacent the other side of the runway and generally toward said other end of the runway;

at least one video recording device for receiving the video signals transmitted by said video cameras; and

video transmission means connecting the cameras to the recording device for transmitting the video signals from the video cameras to the video recording device;

whereby the monitoring system observes and records a visual image of aircraft depicting their external characteristics, the path taken by the aircraft before during and after

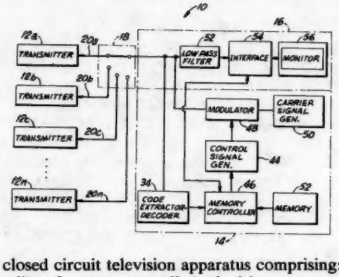
landing or take-off from the runways, to detect malfunctions, pilot error, equipment failure or other evidence which may assist in determining the cause of a crash.

4,989,085

APPARATUS FOR REMOTE VERIFICATION AND CONTROL OF CLOSE CIRCUIT TELEVISION CAMERAS

David Elberbaum, Tokyo, Japan, assignor to Elbex Video, Ltd., Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,577
Claims priority, application Japan, Feb. 29, 1988, 63-44543
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—108 **3 Claims**



1. A closed circuit television apparatus comprising:

a plurality of remote-controlled television cameras for generating video signals, each camera including a circuit for generating 1st code signals allotted to a respective television camera;

receiving means for receiving said video signals and said 1st code signals;

switching means for selecting a television camera to be connected to said receiving means;

said receiving means including a monitor for displaying images corresponding to the video signals received in said receiving means; and

controlling means for controlling said television camera;

said controlling means including control and code generator means for generating control signals to control said television camera and 2nd code signals corresponding to the 1st code signals received in said receiving means and for transmitting said control signals and said 2nd code signals to said television camera;

each television camera further including a command circuit receiving said control signals and said 2nd code signals generated in said controlling means and operating said television camera in accordance with said control signals when said 2nd code signals coincide with a code allotted to said television camera.

4,989,086

ULTRA WIDE FIELD-OF-REGARD MULTISPECTRAL IMAGING RADIOMETER

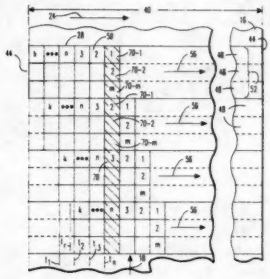
Fred L. Scaff, Ellicott City, and Leslie L. Thompson, Bowie, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 201,222, Jun. 2, 1988, abandoned. This application Sep. 29, 1988, Ser. No. 250,655
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—109 **14 Claims**

1. An imaging radiometer mounted on a platform moving in a uniform trajectory in an in-track direction, said radiometer for scanning an area of interest laterally of the in-track direction in a cross-track direction, said area defined by a field-of-view dimension in the in-track direction and a field-of-regard dimension in the cross-track direction, said imaging radiometer comprising:

at least one scanning mirror having a viewing area directed toward the area of interest, the mirror being movably mounted on the platform for scanning between extreme ends of the field-of-regard in the cross-track direction of the platform, said mirror producing an image representing a portion of the area of interest within the viewing area of the mirror;

means for driving the mirror at near-contant rate relative to the extremes of the field-of-regard and inversely of the in-track direction of the platform, the image produced by the mirror changing with the position of the mirror relative to the portion of the area of the interest within the viewing area of the mirror;



an image forming means mounted on the platform in fixed relation with the mirror for viewing the mirror and redirecting the changing image along an optical path; and

multi-element detector means mounted in the optical path in fixed relationship with the image forming means for receiving the changing image thereon over a selected time interval and periodically producing an electrical output, each output representing a different image over each time interval, selected elements of the detector means being responsive to receive in successive time intervals, the same portion of the changing image.

4,989,087

MULTI-PREDICTIVE METHOD TO ESTIMATE THE MOTION OF THE POINTS OF AN ELECTRONIC PICTURE

Daniele Pele, and Bruno Choquet, both of Rennes, France, assignors to Etat Francais (CNET), Issy Les Moulineaux and Telediffusion De France, Montrouge Cedex, both of, France

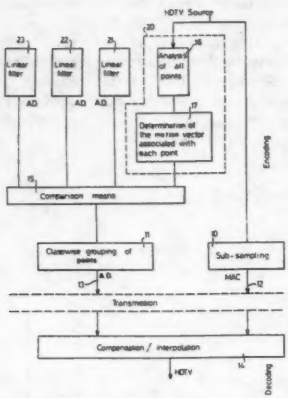
Filed Dec. 14, 1988, Ser. No. 284,390
Claims priority, application France, Dec. 16, 1987, 87 17601
Int. Cl.[5] G06F 15/70; H04N 7/137
U.S. Cl. 358—136 **13 Claims**

1. An image signal compaction process of motion estimation for assigning at instant t to each current point comprising a first image, a first value of a motion vector in a plane of said first image, whereby the position of each current point of said first image may be accurately approximated at an instant (t+1) in a later, second image, said compaction process comprising the steps of:

(a) predicting said first value of said motion vector of each current point of said first image by identifying it with a second value of said motion vector associated with a corresponding, antecedent point of a third image at an earlier instant (t−1), said current point being the approximate projection of said antecedent point along said second value of said motion vector, each of said first, second and third images having a characteristic, and

(b) correcting said predicted first value of said motion vector

by optimization in accordance with the differences between said characteristics of said first and second images,



said predicted first value of said motion vector being taken as a starting hypothesis for said step (b) of correcting.

4,989,088

ERROR CORRECTION SYSTEM USED IN PICTURE TRANSMISSION

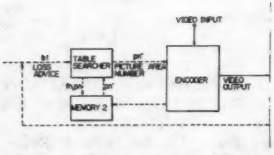
Masahiro Wada, and Yasuhiro Takishima, both of Saitama, Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan

Filed Dec. 7, 1989, Ser. No. 447,479

Claims priority, application Japan, Dec. 15, 1988, 63-314947

Int. Cl.[5] H04N *7/12, 7/18*

U.S. Cl. 358—136 **5 Claims**



1. An error correction system in a picture transmission system in which a moving picture frame is inter-frame coded, and a coded moving picture signal is divided into transmission blocks for transmission, said error correction system comprising:

a receiver side having

a decoder for decoding picture blocks to provide a video output signal,

means for recognizing a transmission block loss in transmission,

means for calculating an area in picture frames affected by said lost transmission block,

means for supplying said decoder with provisional compensation data for an area which is effected by loss of a transmission block, and

means for information a transmitter side about said picture area affected by the loss of the transmission block;

a transmitter side having

an encoder for encoding an input video signal using an information suppression technique,

means for identifying an affected picture area in a picture frame which has been already transmitting upon receipt of information about the loss of the picture area by said receiver side,

means for calculating propagation of the affect by said lost picture area to a succeeding picture frame, and

said encoder coding said succeeding frame without using said affected areas.

4,989,089

TELEVISION PICTURE CODING DEVICE AND CORRESPONDING DECODING DEVICE, A TELEVISION PICTURE TRANSMISSION SYSTEM INCORPORATING SUCH DEVICES, AND TRANSMISSION AND RECEIVING STAGES OF SUCH A SYSTEM

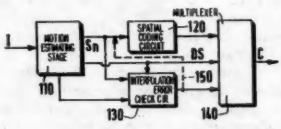
Olivier Chantelou, Paris, and Jean-Jacques Lhuillier, Saint-Maur, both of France, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1989, Ser. No. 431,503

Claims priority, application France, Nov. 8, 1988, 88 14559; Mar. 3, 1989, 89 02798

Int. Cl.[5] H04N *7/137*

U.S. Cl. 358—136 **12 Claims**



1. A television picture coding device comprising in particular:

(A) a motion-estimating stage;

(B) a control stage for controlling said motion estimation;

(C) a coding stage;

(D) a multiplexing stage; characterized in that, the original pictures being constituted by interlaced fields and organized into information blocks, it also has the following characteristic features:

(A) the motion-estimating stage comprises:

(a) displacement vectors determining means, arranged to receive said original pictures and to supply displacement vectors associated with each one of said blocks; and

(b) format converting means arranged to receive the original pictures and said displacement vectors which are block-wise associated with them and supplies the sequential fields in accordance with the nature of said displacement vectors;

(B) the motion-estimating control stage comprises:

(c) comparator means for making a comparison between a recovery of non-transmitted fields to be recovered on reception and the fields of the original pictures corresponding thereto; and

(d) modifying means for modifying, if there is excessive distortion between these compared fields, information components to be transmitted;

(C) the coding stage comprises a spatial coding circuit; and

(D) the multiplexing stage is arranged to ensure the multiplexing of the output signals of the coding stage of the motion-estimating stage.

4,989,090
TELEVISION SCAN LINE DOUBLER INCLUDING TEMPORAL MEDIAN FILTER

Jack J. Campbell, San Francisco; Yves C. Faroudja, Los Altos, and Thomas C. Lyon, San Jose, all of Calif., assignors to Yves C. Faroudja, Sunnyvale, Calif.

Filed Apr. 5, 1989, Ser. No. 334,004
Int. Cl.[5] H04N 7/01
U.S. Cl. 358—140 **30 Claims**

1. A television line doubler for doubling the number of scan lines available for display upon a display device, the line doubler comprising:

temporal median filter means for receiving, selecting and outputting the median pixel as an interpolation pixel i in a one field delayed field F1, from a group of input pixels including:

an actual pixel value c from a present field F0,

a pixel average value in the field F1 of F1(a+b)2 wherein a is the pixel n the scan line above the pixel i location and b is the pixel in the scan line below the pixel i location, and

an actual pixel value d from a two field delayed field F2,

real pixel time compression means connected to time compress the pixels of each scan line of the F1 into half of the original scan time and to put out time compressed scan lines during a first double scan rate line scan interval,

interpolated pixel time compression means connected to time compress the interpolated pixel i of each scan line put out by the temporal median filter means into half of the original scan time and to put out the time compressed scan lines during a second double scan rate line scan interval, and

switch means for switching between the outputs of the real pixel time compression means and the interpolated pixel time compression means for putting out line doubled video to the display device.

4,989,091
SCAN CONVERTER FOR A HIGH DEFINITION TELEVISION SYSTEM

Keith Lucas, Oak Ridges, Canada, assignor to Scientific-Atlanta, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 272,064, Nov. 16, 1988. This application Apr. 28, 1989, Ser. No. 344,830
Int. Cl.[5] H04N 7/01
U.S. Cl. 358—140 **15 Claims**

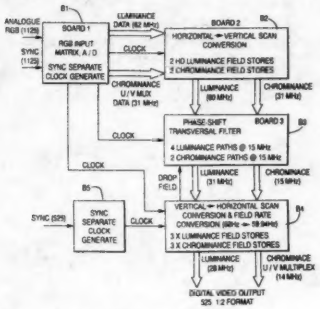
1. A method of converting a high definition television signal having a first number N of lines per frame to a high definition television signal having a second number M of lines per frame where N is greater than or equal to twice M, the method comprising the steps of

sampling the high definition signal of N lines,

ignoring a number of lines from the top and bottom of an image of the high definition signal if N is greater than 2M, the result being a signal of 2M lines,

spatially shifting lines in each field by a fraction of a line, odd and even fields being shifted in opposite directions,

counting the number of fields until a predetermined number,


ANALOGUE RGB (112)
SYNC (112)
BOARD 1
RGB INPUT MATRIX A / D
SYNC SEPARATE CLOCK GENERATE
LUMINANCE DATA (62 MHz)
CLOCK
CHROMINANCE U / V MUX DATA (31 MHz)
BOARD 2
HORIZONTAL ⇒ VERTICAL SCAN CONVERSION
2 HD LUMINANCE FIELD STORES
2 CHROMINANCE FIELD STORES
LUMINANCE (62 MHz)
CHROMINANCE (31 MHz)
PHASE SHIFT TRANSVERSAL FILTER
BOARD 3
4 LUMINANCE PATHS @ 15 MHz
2 CHROMINANCE PATHS @ 15 MHz
DROP FIELD
LUMINANCE (31 MHz)
CHROMINANCE (15 MHz)
SYNC (525)
SYNC SEPARATE CLOCK GENERATE
VERTICAL ⇒ HORIZONTAL SCAN CONVERSION & FIELD RATE CONVERSION (60 Hz ⇒ 59 MHz)
3 X LUMINANCE FIELD STORES
3 X CHROMINANCE FIELD STORES
LUMINANCE (28 MHz)
CHROMINANCE U / V MULTIPLEX (14 MHz)
DIGITAL VIDEO OUTPUT 525 1:2 FORMAT

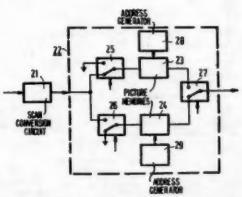
discarding one field of samples and

reversing the direction of spatial shifting of samples from the previous field to the next field.

4,989,092
PICTURE DISPLAY DEVICE USING SCAN DIRECTION TRANSPOSITION

Terence Doyle; Leendert Vriens, and Matheus J. G. Lammers, all of Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Nov. 28, 1989, Ser. No. 442,081
Claims priority, application Netherlands, Dec. 7, 1988, 8802998
Int. Cl.[5] H04N 7/01
U.S. Cl. 358—140 **36 Claims**



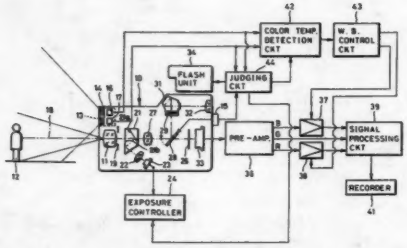
1. A picture display device suitable for receiving and processing an incoming video signal which comprises horizontally scanned picture information and for displaying pictures which are composed of fields each of which comprises a given number of lines, said device comprising a scanning section for generating line and field scanning signals for forming the lines and fields, respectively, and a video signal processing section for processing the picture information which is present in the video signal, characterized in that the scanning section is adapted to scan the lines in the vertical direction, a plurality of vertical lines constituting a field, the vertical line frequency being many times higher, at least 200 times, than the horizontal field frequency, the video signal processing section comprising a scan direction transposition circuit for receiving the picture information and for sequentially assigning picture information to elements of the vertically scanned lines.

4,989,093

CAMERA AUTOMATICALLY OPERABLE IN A FLASH PHOTOGRAPHIC MODE FOR PROVIDING COLOR-BALANCED IMAGES

Kiyotaka Kaneko, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 24, 1989, Ser. No. 300,940
Claims priority, application Japan, Jan. 25, 1988, 63-7806[U]
Int. Cl.[5] H04N *5/235*
U.S. Cl. 358—213.19 19 Claims



1. A camera changeable to a flash photographic mode, comprising:

photoelectric means for detecting light from a subject field to provide a photoelectric output proportional to the quantity of said light detected therefrom;

means for deciding if said light detected by said photoelectric means is fluorescent light based on said photoelectric output to provide a signal; and

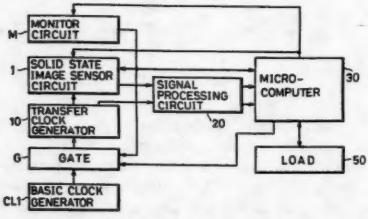
means for automatically changing said camera to said flash photographic mode in response to the presence of said signal.

4,989,094

SOLID STATE IMAGE SENSOR DRIVE APPARATUS

Toshio Norita, Sakai; Tokuji Ishida, Daito; Masataka Hamada, Osaka; Toshihiko Karasaki, Sakai, and Nobuyuki Taniguchi, Nishinomiya, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 41,080, Apr. 21, 1987, Pat. No. 4,809,077. This application Dec. 21, 1988, Ser. No. 287,051
Claims priority, application Japan, Apr. 22, 1986, 61-93157
Int. Cl.[5] H04N *3/14*
U.S. Cl. 358—213.19 3 Claims



1. A solid state image sensor drive apparatus comprising:

a plurality of light receiving elements for receiving light impinged thereon and outputting electric charges,

electric charge accumulating means for accumulating the electric charge outputted from each of said light receiving elements,

accumulation time control means for controlling the accumulation time of the electric charges in said electric charge accumulating means and generating a stop signal designating the stop of the accumulation,

serial output means for storing the electric charges accumulated in said electric charge accumulating means and outputting serially the stored electric charges,

transfer means for transferring, in parallel, the electric charges accumulated in said electric charge accumulating means to said serial output means in response to the stop signal from said accumulation time control means,

data reading means for reading data stored in said serial output means,

transfer signal generating means for generating a transfer signal for successively transferring to said data reading means the electric charges stored in said serial output means, and

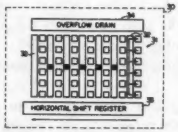
control means for interrupting and restarting the transmission of the transfer signal from said transfer signal generating means during a period when said data reading means successively reads the electric charges stored in said serial output means based on the transfer signal.

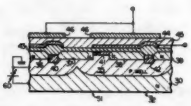
4,989,095

CONTROLLING METHOD FOR TWO DIMENSIONAL CHARGE-COUPLED DEVICE IMPROVED IN ANTI-BLOOMING CAPABILITY

Warren Whitesel, and Akiyoshi Kohno, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jun. 13, 1989, Ser. No. 365,310
Claims priority, application Japan, Jun. 15, 1988, 63-148769
Int. Cl.[5] H04N *3/14*
U.S. Cl. 358—213.19 17 Claims





1. A controlling method for a charge-coupled device fabricated on a semiconductor substrate and comprising a plurality of photo sensing elements arranged in columns and operative to convert an optical radiation into electric charges, respectively, a multiple-stage horizontal shift register, an overflow drain, a plurality of multiple-stage vertical shift registers interleaved with said columns of said photo sensing elements and operative to transfer said electric charges to one of said multiple-stage horizontal shift register and said overflow drain, and a photo shield film provided over said photo sensing elements and having a plurality of windows located in such a manner as to allow said optical radiation to fall on the photo sensing elements, said controlling method comprising the steps of:

(a) accumulating effectual electric charges in the presence of said optical radiation into said photo sensing elements while applying a first voltage level to said photo shield film for promoting the production of said effectual electric charges while ineffectual electric charges are swept into said overflow drain through said multiple-stage vertical shift registers in response to a first driving pulse signal, and

(b) transferring said effectual electric charges to said multiple-stage shift register while applying a second voltage level to said photo shield film for restricting the production of said ineffectual electric charges in said photo sensing elements.

4,989,096

PRODUCING HALF-TONE IMAGES OF HIGHER RESOLUTION THROUGH INTERPOLATION OF ORIGINAL DATA

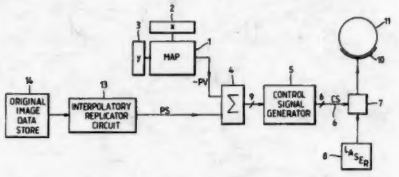
Graham Webb, and Richard A. Kirk, both of Hertfordshire, assignors to Crosfield Electronics Limited, London, England

Filed May 16, 1989, Ser. No. 352,521

Claims priority, application United Kingdom, May 16, 1988, 8811568

Int. Cl.[5] H04N *1/23, 1/40*

U.S. Cl. 358—298 10 Claims



1. A method of generating a half-tone version of an image represented by a first set of digital data defining the colour content of abutting pixels of said image at a first resolution in which a record medium is selectively exposed in response to a control signal representing image pixels at a second, finer resolution, the control signal being generated by comparing a second set of digital data with half-tone information wherein said second set of digital data is at least partly interpolated from the said first set of data.

4,989,097

APPARATUS FOR REPRODUCING AND PROCESSING PICTURE INFORMATION FROM A RECORDING MEDIUM

Junichi Yoshio, and Masami Suzuki, both of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Japan

Filed Sep. 28, 1988, Ser. No. 250,066

Claims priority, application Japan, Apr. 4, 1988, 63-82619

Int. Cl.[5] H04N *5/93*

U.S. Cl. 358—335 3 Claims

1. An apparatus for reproducing and processing picture information obtained from a recording medium to form a picture signal, wherein a recording medium code and a plurality of graphic codes including the picture information are inserted as a subcode of a coded information signal stored on the recording medium, wherein said picture information occupies N channels where N is a natural number greater than 1, and wherein said recording medium code specifies the recording medium, said apparatus comprising:

read means for reading the coded information signal from the recording medium;

input means for inputting the subcode from the coded information signal;

separating means for separating means for separating the recording medium code from the subcode;

instruction generating means for generating an instruction for selecting one of said N channels by a manual operation during playing of the recording medium;

designating channel data generating means for writing to a program memory the instruction and the recording medium code when the instruction is generated;

output means for outputting in response to a program-play command designated channel data indicating a channel designated by the instructions stored in the program memory when the recording medium code stored in program memory and the recording medium code output from the separating means are identical; and

picture signal generating means for generating the picture signal from one of said plurality of graphic codes occupying the one of said N channels designated by said designated channel data.

4,989,098

PROCESSING APPARATUS USING SELECTABLE PERIOD TRIANGULAR OR SAWTOOTH WAVES

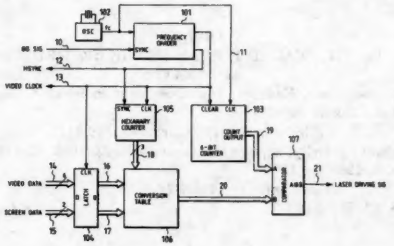
Shinobu Arimoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,935

Claims priority, application Japan, Dec. 1, 1987, 62-301404

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—455 12 Claims



1. An image processing apparatus comprising:

input means for inputting an image signal;

conversion means for converting the image signal input from said input means and outputting the converted image signal; and

output means for outputting a pulse-width modulation signal based on the converted image signal output from said conversion means,

wherein said output means is operated in a fixed-period processing mode regardless of an output characteristic of the pulse-width modulation signal, and outputs the pulse-width modulation signal, and wherein said conversion means switches a conversion mode of the input image signal in association with the output characteristic of the pulse-width modulation signal.

4,989,099

IMAGE INFORMATION READING APPARATUS

Takashi Koshiyouji, Yokohama, and Hiroyuki Mori, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 14, 1988, Ser. No. 257,676

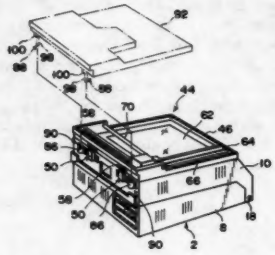
Claims priority, application Japan, Oct. 16, 1987, 62-261194

Int. Cl.[5] H04N *1/00*

U.S. Cl. 358—474 12 Claims

11. An apparatus according claim 10, wherein said lighting means includes a light source disposed above said original supporting means and wherein said reading means includes a

scanner disposed in said main body, said scanner and said light source being movable simultaneously in the same direction and



at the same speed to read an original of the light transmitting type.

4,989,100

IMAGE READER FOR AN IMAGE RECORDING APPARATUS

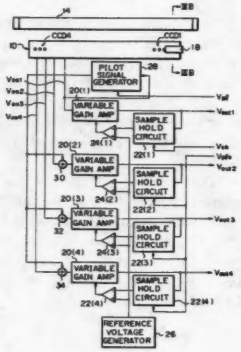
Kazumi Ishima, Kashiwa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 22, 1989, Ser. No. 369,817

Claims priority, application Japan, Jun. 22, 1988, 63-154248; Jan. 9, 1989, 1-2327

Int. Cl.[5] H04N *1/10, 1/04*

U.S. Cl. 358—483 **9 Claims**



1. An image reader for an image forming apparatus, comprising:

fragmentary image reading means comprising a plurality of sensors which are arranged in an array along an image reading line;

a reference white plate located in association with a particular position of and outside of an effective pixel reading range of one of two of the sensors which are situated at opposite ends of the image reading line, said one sensor producing a reference white signal by reading said reference white plate; and

control means for controlling an output gain of said one sensor in dependence on the reference white signal.

4,989,101

TAPE SYNCHRONIZING APPARATUS HAVING SELF-CORRECTING OFFSET CALCULATION

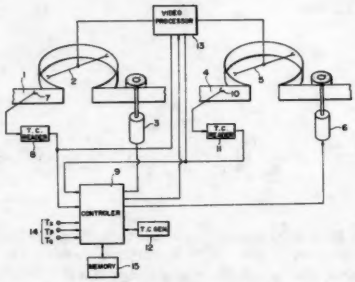
Hidehiko Sasho, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 11, 1989, Ser. No. 392,358

Claims priority, application Japan, Aug. 12, 1988, 63-201099

Int. Cl.[5] H04N *5/782;* G11B *27/10*

U.S. Cl. 360—14.3 **6 Claims**



1. A tape synchronizing apparatus for a tape reproducer which uses a tape having information signals and time code signals recorded thereon and is adapted to reproduce said information signals and time code signals from said tape, said apparatus comprising:

means for generating and storing a first time code corresponding to an in-point after which the reproduced information signal becomes effective;

means for rewinding said tape to a preroll point advanced from said in-point by a predetermined amount;

means for generating a reference time code incremented in accordance with a reference time;

means for generating and storing a first reference time code corresponding to said in-point;

means for presetting said reference time code generating means to a second reference time code advanced from said first reference time code by the sum of the time corresponding to said predetermined amount and an offset amount;

means for calculating, at an instant after the tape speed becomes constant, the time difference between a first remaining time interval, which is existent from the time code which is read at said instant up to the first time code corresponding to said in-point, and a second remaining time existent from the reference time code generated by said reference time code generating means at said instant to said first reference time code; and

means for correcting said offset amount in response to the time difference generated from said calculating means.

4,989,102

APPARATUS FOR MAGNETICALLY RECORDING AND/OR REPRODUCING DIGITAL SIGNALS IN A PLURALITY OF MODES HAVING DIFFERENT FORMATS

Noboru Murabayashi, Tokyo, and Keiji Kanota, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 252,925

Claims priority, application Japan, Oct. 8, 1987, 62-253974

Int. Cl.[5] G11B *5/02*

U.S. Cl. 360—27 **4 Claims**

1. An apparatus for magnetically recording and/or reproducing a digital signal in a first mode characterized by a respective transfer rate and format or in a second mode characterized by a respective transfer rate and format, said apparatus comprising:

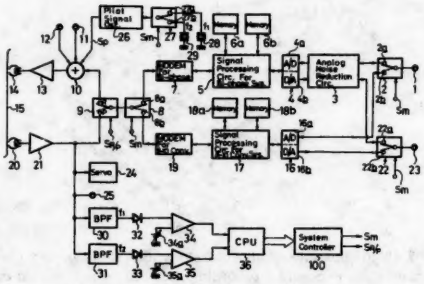
means for generating a first pilot signal having a first fre-

quency and a second pilot signal having a second frequency different from said first frequency;

means operative in said first and second modes during a recording operation of the apparatus for selectively mixing said first and second pilot signals, respectively, with the digital signal to be recorded, and thereby providing a resultant mixed signal;

means selectively operative for recording and reproducing said mixed signal; and

means operative during a reproducing operation of the apparatus for selectively detecting, in the reproduced mixed signal, said first and second pilot signals having said first



and second frequencies, respectively, and, on the basis of the detected pilot signal, establishing the respective one of said first and second ;modes of the apparatus, including first and second band pass filter means receiving the reproduced mixed signal and adapted to pass said first and second frequencies, respectively, first and second rectifier means receiving outputs of said first and second band pass filter means, respectively, and first and second comparators for comparing outputs of said first and second rectifier means with respective reference levels and thereby selectively indicating the presence of said first or second pilot signal in said reproduced mixed signal.

4,989,103

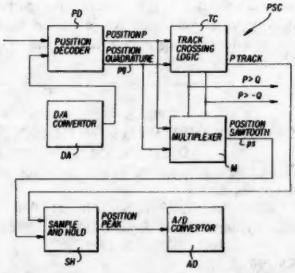
ADJUSTMENT OF POSITION SLOPE FOR DISK DRIVE SERVO USING HALF-TRACK POINT

Nicholas M. Warner, Livermore, and Andrew M. Rose, Mountain View, both of Calif., assignors to Unisys Corp., Detroit, Mich.

Continuation of Ser. No. 21,098, Mar. 3, 1987, abandoned. This application Feb. 20, 1990, Ser. No. 483,975

Int. Cl.[5] G11B *5/02*

U.S. Cl. 360—67 **9 Claims**



1. A method of automatically adjusting the slope of position servo signals in a servo control mechanism, wherein position signal amplitude is adjusted at the "half-track" point rather than at a peak point, this method comprising;

deriving position signals (po) and position quadrature signals (qo) from servo transducer and related processing means;

applying signals po, qo to position decoder means PD adapted to vary the amplitude of these signals according to associated variable input signals provided by D/A convertor means, whereby PD responsively issues modified position signals (p) and position quadrature signals (pq)

applying these signals p, pq to track crossing means TC and to multiplexer means M, with track crossing means TC responsively generating binary track-crossing signals "P>Q" "P>−Q" and "P-track", these also being applied to multiplexer means M, whereupon M responsively generates a position-sawtooth signal ps;

applying sawtooth signals ps to sample-hold means SH adapted to hold the peak value of sawtooth ps,

feeding the output of SH to A/D convertor means AD; measuring the amplitude of the position peak signal for each P>Q transition; while retaining n past peak values, averaging these and comparing them with a prescribed reference Vr, to yield an offset value Vo; adjusting the D/A convertor DA to decrease the value of Vo; and repeating the foregoing steps until Vo reaches zero or some prescribed minimum.

4,989,104

APPARATUS FOR RECORDING AND QUICKLY RETRIEVING VIDEO SIGNAL PARTS ON A MAGNETIC TAPE

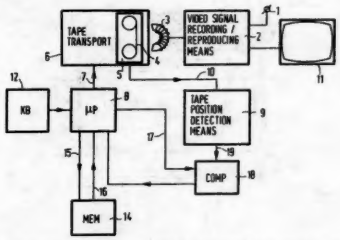
Reinhard Schülein, Oberasbach/Altenberg, and Ernst Bratenstein, Fürth/Bay, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 257,359, Oct. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 88,343, Aug. 21, 1987, abandoned. This application Mar. 7, 1990, Ser. No. 492,435

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628743

Int. Cl.[5] G11B *15/18*

U.S. Cl. 360—72.1 **12 Claims**



1. An apparatus for recording, identifying and quickly retrieving programs or other video signal parts recorded on a magnetic tape, comprising:

a video cassette recorder,

an operating keyboard,

a comparator,

a memory for storing information about the respective locations of video signal parts on magnetic tape in a cassette, and

a microprocessor and interconnecting means interconnecting said keyboard, comparator, microprocessor, and memory, operable during tape transport to compare information identifying a desired signal part entered through the keyboard with information corresponding to the instantaneous tape position,

characterized in that said memory is arranged for storing information about the respective locations of a plurality of video signal parts on magnetic tapes contained in a plurality of magnetic tape cassettes,

a given storage area of the memory is identified for storing

information about a given one of said magnetic tape cassettes,

during recording, said microprocessor operates as means for automatically storing information about the locations of video signal parts at the given storage area of the memory corresponding to a given cassette identification data entered through the keyboard, and

for retrieving a desired video signal part, during transport in a quick wind mode information corresponding to the instantaneous tape position is compared in the comparator with information about the location of a video signal part corresponding to data identifying said part entered through said keyboard.

4,989,105

CASSETTE TAPE PLAYER

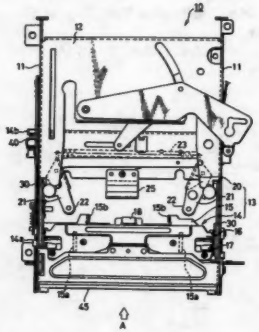
Manabu Yamashita, Iwaki, Japan, assignor to Alpine Electronics Inc., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 239,101

Claims priority, application Japan, Dec. 14, 1987, 62-189696

Int. Cl.[5] G11B *15/675*

U.S. Cl. 360—96.5 **3 Claims**



1. A cassette loading apparatus for a front-loading tape player, the cassette being of the type having an openable and closable lid, said apparatus comprising:

a housing;

holding means movably mounted on said housing for holding said tape cassette, and for moving said tape cassette from an insert position to an operative position and from an operative position to an eject position; and

said holding means comprising:

a first holder for moving said tape cassette from a holding position to said operative position and from said operative position to said holding position;

a second holder interlockingly engaged with said first holder for moving said tape cassette from said insert position to said holding position, and from said holding position to said eject position; and

means proximally located for forcibly closing said lid so as to allow said tape cassette to be moved into said eject position.

4,989,106

CASSETTE LOADING DEVICE WITH PULL-IN MECHANISM

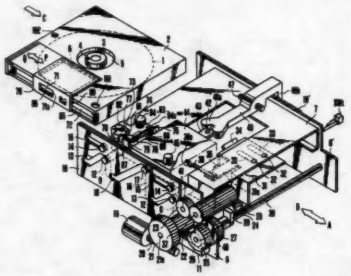
Tsukasa Uehara, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 218,459, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 707,871, Mar. 4, 1985, abandoned. This application Apr. 11, 1990, Ser. No. 512,084

Claims priority, application Japan, Mar. 2, 1984, 59-39786

Int. Cl.[5] G11B *17/04, 5/016*

U.S. Cl. 360—99.02 **37 Claims**



1. In an apparatus using a cassette which is provided with an opening for exposing a recording medium housed in said cassette, said opening having a shutter arranged to be opened in response to loading of said cassette into said apparatus, said cassette being provided with at least one positioning hole near the shutter to position the cassette loaded in a loading position in the apparatus by engaging with a member in the apparatus, a cassette loading device comprising:

(a) holding means movably arranged to receive and hold the cassette and to load the received cassette to said loading position in said apparatus, said holding means having an opening for receiving the cassette and having a guiding member for guiding the cassette in a direction to a predetermined first position in the holding means;

(b) pull-in means for pulling the cassette inserted to the first position through the opening, in the direction from the first position to a second position in the holding means, in response to the receiving of the cassette in said first position, said pull-in means having an engaging member engageable with the positioning hole of the cassette in said first position, said pull-in means having an engaging member engageable with the positioning hole of the cassette near said shutter and pulling the cassette in the second position in the holding means with engagement of said engaging member and the positioning part, thereby loading the cassette into the apparatus; and

(c) shutter opening means arranged to come into engagement with the shutter of the cassette and to open the same on the way when the cassette is pulled to the second position in said holding means under the action of said pulling means.

4,989,107

MICROFLOPPY DISK DRIVE WITH CENTERING MECHANISM

Nobuhiko Tsukahara, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 17, 1986, Ser. No. 887,080

Claims priority, application Japan, Jul. 23, 1985, 60-162272

Int. Cl.[5] G11B *17/022*

U.S. Cl. 360—99.08 **15 Claims**

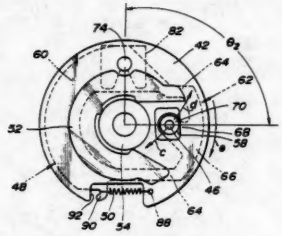
1. A disk drive apparatus for rotatingly driving a magnetic disk of the type having a center aperture and a driving and positioning aperture, comprising:

a rotary base means for rotating a magnetic disk, the rotary

base means having an upper surface mounting thereon for supporting the magnetic disk;

a center pin fixedly mounted on the rotary base means for rotation therewith and for engaging the center aperture of a disk being driven;

a drive pin for engaging the driving and positioning aperture of the disk and drive pin support means for mounting the drive pin on the rotary base means for rotation therewith



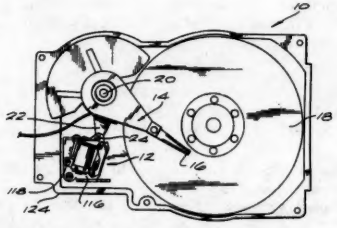
such that the drive pin is displaceable at least in a direction toward and away from the center pin in a plane substantially parallel with the upper surface of the rotary base means and the axis of the drive pin is inclinable both generally toward the center pin and generally in a direction opposite to the direction of rotation of the rotary base means, for chucking and centering a magnetic disk on the rotary base means.

4,989,108

ELECTRO-MECHANICAL LATCH

David Chang, Encino, Calif., assignor to Micropolis Corporation, Chatsworth, Calif.

Filed Oct. 3, 1989, Ser. No. 416,663
Int. Cl.[5] G11B *5/54, 21/22*
U.S. Cl. 360—105 **30 Claims**



1. An electro-mechanical latch comprising:

a solenoid including an armature movable from a normally biased first position to a second position in response to an electrical current applied to said solenoid, said armature when in said first position being adapted to latch a device in a parked position, said armature when in said second position, being non-interactive with said device;

means for holding said armature in said second position in response to said armature being moved to said second position upon application of said current to allow subsequent removal of said current; and

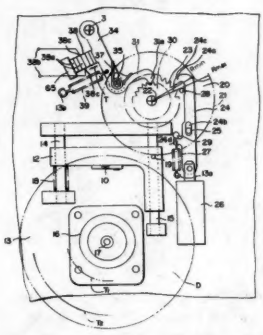
means for releasing holding of said armature in response to said device returning to said parked position whereby said armature returns to sad normally biased first position to latch said device.

4,989,109

APPARATUS FOR ACCURATELY POSITIONING A MAGNETIC RECORDING AND REPRODUCING HEAD

Tahei Morisawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1988, Ser. No. 204,728
Claims priority, application Japan, Jun. 12, 1987, 62-146660
Int. Cl.[5] G11B *5/55, 5/56*
U.S. Cl. 360—106 **11 Claims**



1. A magnetic disk recording and reproducing apparatus, comprising:

a carriage which is adapted to support a magnetic head, said magnetic head being adapted to move in radial directions with respect to a magnetic disk which is rotatably supported on a body of said apparatus;

a cam that is rotatable about a rotational shaft to move said carriage;

an intermittent rotation mechanism for intermittently rotating said cam over a predetermined angular displacement, said intermittent rotation mechanism comprising:

a ratchet gear coaxially supported by said cam, said ratchet gear and cam being adapted to rotate together, and a feed lever which is movably supported by said body so as to linearly reciprocate in a direction substantially parallel to the direction of movement of said carriage;

a click gear adapted to drive said cam;

a click lever having a pawl at a first end of said click lever, which pawl can disengageably engage said click gear in order to restrict the angular position of said click gear;

a fine adjustment member which movably supports said first end of said click lever; and

driving means for moving said fine adjustment member to adjust the angular position of said click gear in accordance with the track position of said magnetic head relative to said magnetic disk.

4,989,110

FULL RADIUS CARRIER TO DRUM CONTACT IN A ROTARY HEAD SCANNER

Thomas M. Zevin, Van Nuys, and Roy A. Utley, La Crescenta, both of Calif., assignors to Datatape Incorporated, Pasadena, Calif.

Filed Mar. 1, 1989, Ser. No. 317,364
Int. Cl.[5] G11B *15/60*
U.S. Cl. 360—107 **3 Claims**

1. In helical scan recording/reproducing apparatus, a rotary head scanner assembly comprising:

an upper cylindrical scanner drum;

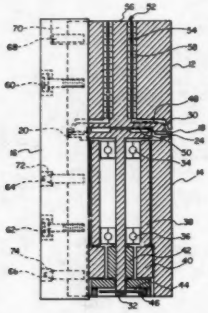
a lower cylindrical scanner drum axially spaced from said upper cylindrical scanner drum;

a magnetic transducer means for transducing information

relative to magnetic tape guided around said drums in a helical path;

means for mounting said transducer means for rotation between said upper and lower scanner drums; wherein said upper drum, said lower drum, and said mounting means are concentric with each other;

an elongated carrier having a lapped, cylindrical arcuate



surface of the same radius as said drums which contacts said upper and lower drums over a single, large continuous region extending over a large, substantially continuous, circumferential angle and extending over substantially the axial length of said drums with no substantially unsupported segment of said drums over said contact regions with said carrier; and

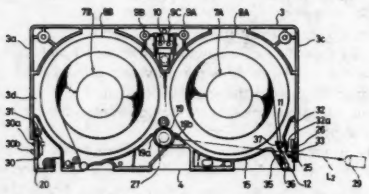
means for fastening said drums to said carrier.

4,989,111

TAPE CASSETTE UTILIZING FIBER OPTIC BUNDLE

Masanori Sato, Miyagi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,679
Claims priority, application Japan, Sep. 13, 1988, 63-229477
Int. Cl.[5] G11B *23/02*
U.S. Cl. 360—132 **13 Claims**



1. An improved tape cassette of the type having an upper cassette half and a lower cassette half, each having side walls, and a light emitting element insertion portion located therebetween, a tape-shaped medium having a light transmissive portion wound between the upper and lower cassette halves and surrounding the light emitting element insertion portion, and a light receiving window through a side wall of one of the upper cassette half or the lower cassette half so as to oppose the light emitting element insertion portion across the tape-shaped medium, whereby when the tape cassette is loaded into a recording and reproducing apparatus, a light emitting element can be inserted into the light emitting element insertion portion and a light receiving element can be located outside of the light receiving window, to thereby establish a light path therebetween and allow detection of the predetermined portion of the tape-shaped medium, the tape cassette comprising:

(a) a rib formed on said upper cassette half;

(b) a rib formed on said lower cassette half; and

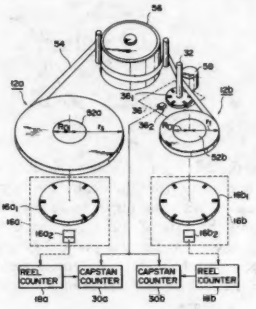
(c) an optical fiber bundle provided along said light path and near said light receiving window.

4,989,112

APPARATUS FOR DISCRIMINATING TYPES OF TAPE CASSETTES

Keiji Hamoda, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 20, 1988, Ser. No. 286,867
Claims priority, application Japan, Dec. 21, 1987, 62-321503
Int. Cl.[5] G11B *15/48*
U.S. Cl. 360—137 **16 Claims**



1. An apparatus for discriminating a type of a tape cassette which is wound around first and second reels, comprising:

tape transmit means for feeding a tape of a tape cassette to be discriminated from one of the first and second reels to the other reel, at a predetermined speed;

detection means for detecting a ratio of rotation of said first reel to rotation of said second reel;

control means for supplying a first control signal to said detection means at a first timing and supplying a second control signal to said detection means at a second timing delayed from the first control signal by a predetermined period of time; and

discrimination means for discriminating a type of the tape cassette on the basis of the ratios detected by said detection means at both said first and second timing, in response to the first and second control signals supplied form said control means.

4,989,113

DATA PROCESSING DEVICE HAVING DIRECT MEMORY ACCESS WITH IMPROVED TRANSFER CONTROL

Kim Asal, Sugarland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 25,443, Mar. 13, 1987. This application Dec. 28, 1987, Ser. No. 138,419
Int. Cl.[5] G06F *13/28*
U.S. Cl. 364—200 **40 Claims**

1. A microcomputer, comprising:

a central processing unit for performing data processing instructions;

a bus, connected to said central processing units;

a DMA control register connected to said central processing unit for storing a start code of at least two bits; and

a DMA controller, connected to said bus and to said DMA control register, for reading data from said bus by placing a source memory address signal thereupon and receiving data therefrom, and for writing data to said bus by placing a destination memory address signal thereupon and presenting data thereto, said reading and writing repetitively performed constituting a DMA transfer of a block, wherein said DMA controller begins said DMA transfer

responsive to a first value of said start code, said DMA controller further operable in selectable ways to stop said DMA transfer including a first way that aborts said DMA transfer upon completion of a next instance of said writing responsive to entry of a second value of said start code into said DMA control register during a read in said DMA transfer, and a second way that aborts said DMA transfer responsive to entry of a third value of said start code.

4,989,114

BRIDGE CIRCUIT HAVING POLARITY INVERSION PROTECTION MEANS ENTAILING A REDUCED VOLTAGE DROP

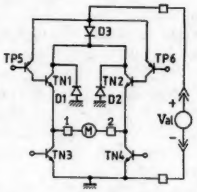
Sandro Storti, Sesto S. Giovanni; Bruno Murari, Monza, and Franco Consiglieri, Piacenza, all of Italy, assignors to SGS-Thomson Microelectronics s.r.l., Italy

Filed Mar. 22, 1990, Ser. No. 497,026

Claims priority, application Italy, Mar. 22, 1989, 83615 A/89

Int. Cl.[5] H02H *3/18*

U.S. Cl. 361—84 **3 Claims**



1. An integrated bridge circuit for driving a load connected across two output pins of the integrated circuit which comprises at least the following semiconductor devices, monolithically integrated by a junction-type isolation technique:

a first NPN transistor having an emitter connected to a first output pin and capable of switchingly connecting said first output pin to a positive supply rail:

a second NPN transistor having an emitter connected to a second output pin and capable of switchingly connect said second output pin to the positive supply rail;

a first PNP transistor having a collector connected to a base of said first NPN transistor and capable of driving the latter in function of a driving signal fed to the base of said first PNP transistor;

a second PNP transistor having a collector connected to a base of said second NPN transistor and capable of driving the latter in function of a driving signal fed to the base of said second PNP transistor;

the bridge circuit further comprising switching means driven by said driving signals connected between said two output pins and a negative supply rail and a guard diode against an accidental supply polarity inversion having a cathode connected to the respective collectors connected in common of said first and second integrated NPN transistors and an anode connected to a positive supply rail, and

characterized by the fact that

the respective emitters of said first and second PNP transistors are connected in common and to the positive supply rail for reducing the voltage drop across the bridge circuit.

4,989,115

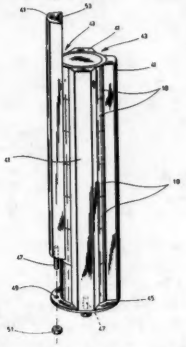
SURGE ARRESTER

Michel Bourdages, Boucherville; Robert Giraldeau, Varennes, and Guy St. Jean, Longueuil, all of Canada, assignors to Hydro Quebec, Montreal, Canada

Filed Aug. 16, 1990, Ser. No. 568,032

Int. Cl.[5] H02H *9/06*

U.S. Cl. 361—126 **8 Claims**



1. In a surge arrester of the single column type, comprising:

a casing made of insulating material and having an inner wall defining a generally cylindrical chamber having two ends of which at least one is an open end;

a single column of varistors disposed inside said chamber, said varistors having the shape of cylindrical disks of a diameter smaller than that of said casing chamber, said disks being stacked one upon the other thereby to form said single column;

means for holding said stacked disks in column form in said casing, and

electric contacts at said two ends of said casing chamber for allowing electrically mounting said column of varistors on terminals of and in parallel across an electric apparatus to be protected against overvoltages,

the improvement wherein:

said disk-holding means include at least three props made of a material which is both insulating and non-elastic; each of said props extending over the full height of said column and being symmetrically arranged therearound to form and hold, all around the said column, rectilinear passages equal in number to the number of props, in case of disk breaking resulting from a severe thermal shock due to an internal failure of the surge arrester; the said passages defined between said inner wall of said casing, said props and said column, allowing any inner electric arc occurring during said internal failure to spread within said chamber and allowing hot gases generated by said arc to exhaust through said open end of said casing thereby reducing risks of explosion of said casing.

4,989,116

CHOPPER CIRCUIT FOR DRIVING ELECTROMAGNET AND/OR STEP MOTOR COILS SUCH AS EMPLOYED IN A MATRIX PRINTER

Manfred Grüner, Ulm, and Franz Riedl, Günzburg, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düseldorf, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 232,311

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3727283

Int. Cl.[5] H01F *7/18*

U.S. Cl. 361—154 **18 Claims**

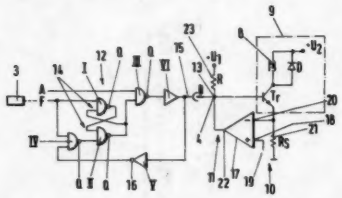
1. A chopper circuit for the driving of electromagnetic coils

and/or step motor coils such as employed in a matrix printer, comprising

finally controlled element having an inductivity and having an input;

a final control circuit having an input and an output, where the output of the final control circuit is connected to the input of the finally controlled element;

a current data acquisition circuit including a current shut-off for shutting off a current and the current shut-off connected to an input of the final control circuit;



a frequency generator having an output for providing a clock cycle signal;

a digital control logic having an input connected to the output of the frequency generator generating a control signal with the clock cycle of the frequency generator, which control signal is present as input or as output signal at the input of the final control circuit alternating with the shut-off of the current.

4,989,117

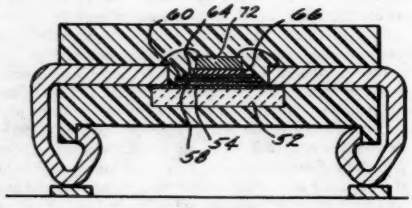
MOLDED INTEGRATED CIRCUIT PACKAGE INCORPORATING THIN DECOUPLING CAPACITOR

Jorge M. Hernandez, Mesa, Ariz., assignor to Rogers Corporation, Rogers, Conn.

Filed Feb. 12, 1990, Ser. No. 479,071

Int. Cl.[5] H01G *1/14;* H05K *7/02;* H01L *23/02*

U.S. Cl. 361—306 **16 Claims**



1. A molded integrated circuit (IC) package comprising:

lead frame means, said lead frame means including a plurality of conductive fingers arranged in a pre-selected pattern, said fingers each having a first end and a second end, said first ends of said fingers terminating at an inner space;

a capacitor provided onto a non-conductive support substrate, said capacitor including leads in the form of circuit traces which extend outwardly therefrom and along a surface of said support substrate, said leads being electrically connected to selected fingers of said lead frame means;

an integrated circuit chip on said capacitor, said integrated circuit chip being electrically connected to said first ends of said fingers; and

molding material encapsulating said integrated circuit chip and capacitor and at least part of said lead frame means.

4,989,118

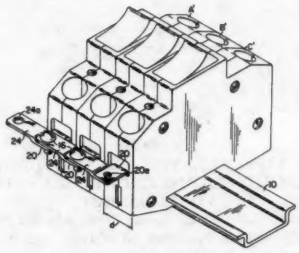
OFF-SET TERMINAL CONFIGURATION FOR ELECTRICALLY COUPLING THE LOAD SIDE OF ADJACENT CIRCUIT BREAKERS

Richard W. Sorenson, Avon, Conn., assignor to Carlingswitch, Inc., Plainville, Conn.

Filed Apr. 21, 1989, Ser. No. 341,470

Int. Cl.[5] H02B *1/00*

U.S. Cl. 361—376 **3 Claims**



1. In combination with a stack of adjacent circuit breakers wherein each circuit breaker has an internal circuit breaker mechanism provided inside a thermoplastic housing of generally rectangular configuration with a depth d such that providing a plurality N of such circuit breaker housing adjacent to one another results in assembly of total depth N times d, the improvement comprising a terminal for each of said plurality of breakers, each said terminal including an internal portion inside the housing for electrical connection to the circuit breaker mechanism, and said terminal also having an external portion outside the housing, said external portion including a first segment oriented generally perpendicularly to the housing end wall and defining an opening, and a flag segment integrally connected to said first segment by an offset portion, said flag segment including an opening spaced by at least approximately the dimension d from said opening in said first segment so as to be generally aligned with an opening in the first segment of an adjacent circuit breaker terminal, said first segment of each of said adjacent circuit breakers lying in a common plane, each said offset portion providing its corresponding flag segment in a common plane spaced from said first mentioned plane by the thickness t of said terminal.

4,989,119

SOLID ELECTROLYTE CAPACITOR WITH TESTABLE FUZE

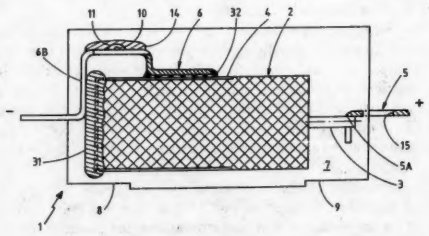
Didier Gouvernelle, Semblancay, France, assignor to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of Ser. No. 324,131, Mar. 16, 1989, Pat. No. 4,899,258. This application Feb. 2, 1990, Ser. No. 474,572

Claims priority, application France, Dec. 19, 1989, 89-16820

Int. Cl.[5] H01G *9/06*

U.S. Cl. 361—534 **10 Claims**



1. A solid electrolyte capacitor comprising a capacitor body (2) embedded in an electrically insulating resin block (7), said

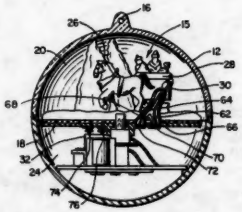
body (2) provided with two electrodes (3, 4) electrically connected to two connecting terminals (5, 6) leading outside said block (7) to form output terminals (+, −); a fuze element (10) with a predetermined useful length is series-connected between said capacitor body (2) and one of said output terminals (5, 6); characterized in that said selected output terminal is formed of first section (6B) attached to one of said electrodes (3, 4) of capacitor body (2) and leading outside of block (7) to form test terminal (B), and second section (6A) electrically insulated with respect to said first section (6B) and said capacitor body (2) and leading outside of block (7) to form said selected output terminal; fuze element (10) alone establishes an electrical link between said sections (6A, 6B), said fuze element (10) is coated with thermally insulating material support (14) reaching from one of said two sections (6A, 6B), material support (14) is itself embedded in said resin block (7).

4,989,120

ENHANCED LIGHTING FOR ORNAMENTS

Terrill M. Davis, Gladstone; Charles J. Flynn, Kansas City, and Jerry L. Knipp, Independence, all of Mo., assignors to Hallmark Cards, Inc., Kansas City, Mo.

Filed Feb. 5, 1990, Ser. No. 475,186
Int. Cl.[5] F21V *21/30*
U.S. Cl. 362—35 **9 Claims**



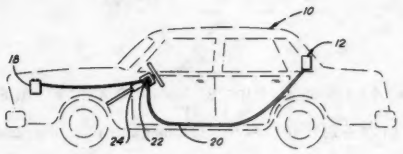
1. An ornament adapted for connection in a string of light sockets on a tree and for hanging from a branch of the tree or other supporting object, said ornament comprising: a rotatable ornamental device including electrically energizable load means, a disc supporting said ornamental device and having an axis of rotation, a support and drive assembly including an electric motor and arranged for supporting said disc and said ornamental device for rotation about said axis of rotation and for effecting rotation thereof about said axis of rotation, a hollow outer housing supporting said support and drive assembly therewithin and surrounding said rotatable ornamental device, said outer housing having a transparent wall for viewing of said ornamental device and having an opaque wall surrounding said support and drive assembly, first and second contact means is slidable engagement, one of said first and second contact means being disposed on said disc and being connected to said electrically energizable load means, the other of said first and second contact means being carried by said support and drive assembly, an electrical connector on said opaque wall, means within said housing connecting said electrical connector to said electric motor and to said second contact means, means including a flexible cable for connecting said electrical connector to one socket of a string of light sockets on the tree, and suspension means extending upwardly from a top end of said housing for suspending said ornament from a suspension point on a branch of the tree, said flexible cable allowing flexibility in location of said suspension point and allowing said ornament to be moved by gravity to assume a position which is such as to provide a relatively stable orientation of said axis of rotation when said ornament is suspended from a branch of the tree.

4,989,121

BRIGHT LIGHT INDICATOR

E. L. Bo Hall, Rte. 5, Box 70G, Ada, Okla. 74820

Filed Oct. 13, 1989, Ser. No. 421,339
Int. Cl.[5] B60Q *1/00*; G02B *5/12*
U.S. Cl. 362—61 **14 Claims**



1. An indicator adapted for use with a first vehicle having an operator for providing a high beam indication when a second vehicle having headlights emitting light and traveling generally behind the first vehicle has the headlights in a high beam condition comprising:

reflective means mountable on the first vehicle and positionable for receiving light emitted from the headlights of the second vehicle and for reflecting the received light in a direction generally toward the second vehicle in an on condition of the reflective means, the light reflected from the reflective means providing the high beam indication; and

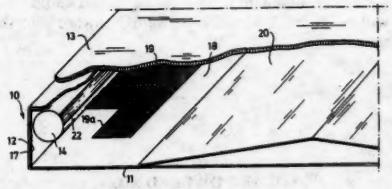
means for conditioning the reflective means in the on condition and for conditioning the reflective means in an off position, the reflective means not reflecting light emitted from the headlights of the second vehicle in the off condition of the reflective means, said means having a portion positionable near the operator whereby said means is controllable by said operator for conditioning the reflective means in the ON or the OFF condition.

4,989,122

LIGHT BOX

Heinz A. Allekotte, Cologne, and Gerd Sturm, Leverkusen, both of Fed. Rep. of Germany, assignors to Marketing-Displays, Fed. Rep. of Germany

Filed Jul. 25, 1989, Ser. No. 384,378
Claims priority, application Fed. Rep. of Germany, May 13, 1989, 8906016[U]
Int. Cl.[5] G09F *13/04*; F21V *7/04*
U.S. Cl. 362—97 **14 Claims**



1. A light box particularly adapted for the attachment of back-lit posters comprising a housing having a back wall, a peripheral wall and an opening opposite the back wall; a diffuser panel spanning said opening, an elongated lamp within said housing adjacent said peripheral wall for emitting radiation from the lamp peripherally inward toward said back wall and said diffuser panel, reflector surface means at said back wall for reflecting emitted radiation toward said diffuser panel, means contiguous said lamp for preventing emitted radiation directed from said lamp directly toward said diffuser panel from impinging upon said diffuser panel, said reflector surface means includes first and second reflector surfaces respectively

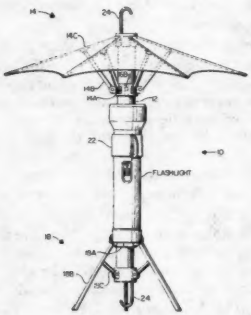
immediately adjacent and more remote from said lamp, said second reflector surface also immediately borders said first reflector surface along a generally common edge remote from said lamp, and said first reflector surface has reflecting capabilities which are less than the reflecting capabilities of said second reflector surface.

4,989,123

COLLAPSIBLE LIGHT SHADE FOR A PORTABLE LIGHT

Christopher F. Best, 6709 New Sharon Church Rd., Rougemont, N.C. 27572

Filed Mar. 27, 1990, Ser. No. 500,072
Int. Cl.[5] A45B *3/02*
U.S. Cl. 362—102 **14 Claims**



1. In combination, a collapsible multi-purpose stand and a flashlight attached thereto comprising:

an elongate handle;

collapsible shade means mounted at one end of said handle, said shade means located adjacent a light emitting end of said flashlight;

collapsible support means mounted at the other end of said handle for supporting said handle and shade means in an upright position, said support means adapted to be adjacent the non-light emitting end of said flashlight; and

securement means attached to said handle at a medial location between said ends thereof and adapted to releasably secure said flashlight to said handle so that said flashlight will be directed generally upwardly toward said shade means.

4,989,124

SOLAR POWERED SIGN

Thomas E. Shappell, 40 Heritage Dr., Reading, Pa. 19607

Filed Aug. 21, 1989, Ser. No. 396,352
Int. Cl.[5] G09F *11/02, 13/00*
U.S. Cl. 362—183 **11 Claims**

1. An improved sign comprising:

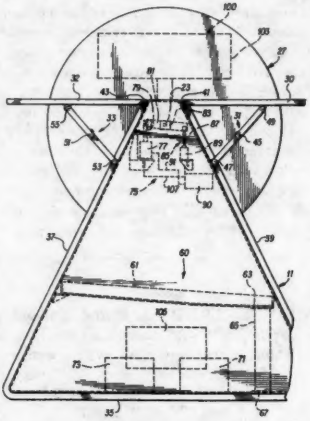
(a) a base having an internal chamber;

(b) said base having a face with a fixed display thereon;

(c) said base carrying a moving display;

(d) drive means for said moving display mounted on said base, said drive means being electrically operated;

(e) at least one solar panel pivotably mounted on said base between a first stored position lying against said base and a second deployed position extending out from said base; and



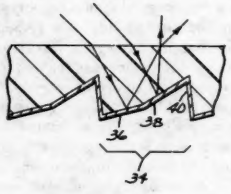
(f) electrical means controllably conveying electrical power from said solar panel to said drive means.

4,989,125

REFLECTOR USING FRESNEL-TYPE STRUCTURES HAVING A PLURALITY OF ACTIVE FACES

Sanford Cobb, Jr., Saint Mary's Point, and Richard A. Miller, Saint Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 10, 1988, Ser. No. 192,212
Int. Cl.[5] F21V *7/00*
U.S. Cl. 362—346 **10 Claims**



1. A lighting fixture comprising:

a housing forming an optical cavity;

an optical window in said housing;

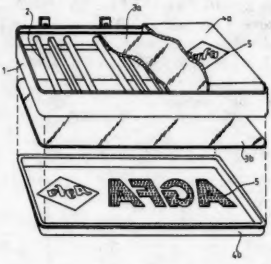
a light source in said optical cavity; and

a reflector having a plurality of Fresnel-type structures on a side of said housing opposing said optical window, at least some of said Fresnel-type structures comprising two adjacent active faces and a riser, one of said active faces being positioned to collimate light from said light source and the other of said active faces being positioned to reflect light from said light source to a location on said optical window adjacent said light source.

4,989,126
ILLUMINATED OUTDOOR ADVERTISING INSTALLATION

Werner Preuss, Leverkusen, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 205,820, Jun. 13, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 422,959
Int. Cl.[5] G09F *13/04*
U.S. Cl. 362—351 **10 Claims**

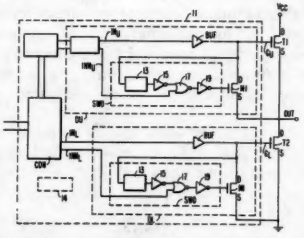


1. Outdoor advertising installation equipped to be illuminated, having different areas which appear, respectively, dark and light by daylight, the brightness of these areas being reversed by night under the influence of artificial light acting from the back so that areas which appear dark by daylight appear bright by night and areas which appear bright by daylight appear dark by night, consisting of a box containing neon lamps, a scattering plate arranged in front of the neon lamps and a plate carrying the information to be displayed (information plate) in front of the scattering plate, characterised in that areas which appear bright by daylight on the information plate are covered with bright back printing and then with dark back printing and areas which appear dark by daylight are covered with a dark back printing of a regular pattern of lines or points.

4,989,127
DRIVER FOR HIGH VOLTAGE HALF-BRIDGE CIRCUITS

Armin F. Wegener, Aachen, Fed. Rep. of Germany, assignor to North American Philips Corporation, New York, N.Y.

Filed May 9, 1989, Ser. No. 349,365
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—16 **19 Claims**



1. A driver circuit for driving a device having a control terminal through which a capacitive current flows during turn-off of the device, comprising:

a first stage having an input terminal and an output terminal, the input terminal being arranged for receiving a control signal for turning such a device, connected to the driver circuit, on and off,

means for connecting said output terminal to the control terminal of said device, to apply thereto a control voltage for turning the device on and off,

current sink means for said capacitive current, comprising a second stage having a current sink terminal connected to said control terminal,

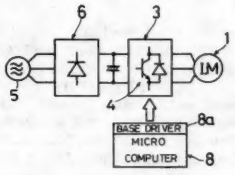
means for sensing said control voltage, and

means, controlled by said means for sensing, for turning said second stage on when said control voltage falls below a first minimum value, and turning said second stage off when said control voltage rises above a second value greater than said first minimum value.

4,989,128
PULSE WIDTH MODULATION CONTROL UNIT OF INVERTER

Kazunobu Ohyama, and Hiroyuki Yamai, both of Kusatsu, Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Apr. 18, 1989, Ser. No. 340,023
Int. Cl.[5] H02M *1/12*
U.S. Cl. 363—41 **14 Claims**



1. A pulse-width modulation control unit for an inverter having a bridge circuit connected to a three-phase winding and having a plurality of switching elements, whereby a D.C. voltage is pulse-width modulated by an ON/OFF operation of each switching element of said bridge circuit and a three-phase A.C. voltage is supplied to said three-phase winding, said control unit comprising:

an arithmetic operation means for calculating an ON time of each switching element at a calculation period corresponding to a carrier frequency;

a dividing means for dividing the ON time of each switching element calculated by said arithmetic operation means; and

a controlling means for controlling the ON time of each switching element by a plurality of pulses obtained by dividing the ON time into said plurality of pulses by said dividing means.

4,989,129
MULTIPLEX CONTROL SYSTEM

Setsuo Arita, Hitachiota; Tetsuo Ito, Hitachi; Satoshi Suzuki, Mito, and Atomi Noguchi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

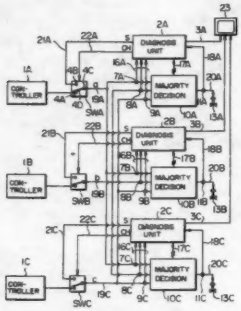
Filed Sep. 9, 1988, Ser. No. 242,170
Claims priority, application Japan, Sep. 11, 1987, 62-226370
Int. Cl.[5] G05B *9/03*
U.S. Cl. 364—187 **10 Claims**

1. A multiplex control system, comprising:

a plurality of test signal generating means provided, respectively, for each of a plurality of control apparatuses installed in parallel with one another, for diagnosis of abnormality;

at least one signal selecting means for selecting from the signals produced by said plurality of control apparatuses a signal for operating a device under control; and

a plurality of diagnosis units for deciding presence or absence of abnormality in said signal selecting means on the



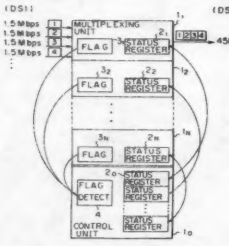
basis of the signals inputted to said signal selecting means and the signal outputted therefrom.

4,989,130

SYSTEM FOR DETERMINING AND STORING VALID STATUS INFORMATION RECEIVED FROM CROSS COUPLED UNIT

Junichi Moriyama, and Masaaki Iwasaki, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 7, 1988, Ser. No. 280,884
Claims priority, application Japan, Dec. 7, 1987, 62-307637
Int. Cl.[5] G06F *11/16*
U.S. Cl. 364—200 **6 Claims**



1. An initial status setting system for a multi-unit system having a plurality of units, comprising:

for each of at least first and second units of said plurality of units and respectively corresponding thereto:

a status register for holding at least a set of status data;

registered status validity indicating means for providing an indication output representing whether the set of status data held in the status register of the corresponding said unit is valid or invalid;

status validity receiving and detecting means for receiving the indication provided by the registered status validity indicating means of the other of said first and second units and detecting from the received indication whether the set of status data held in the associated status register of said other of said first and second units is valid or invalid and for producing corresponding valid and invalid detection outputs;

means for transferring the set of status data held by the status register thereof to the other of said first and second units and for transferring the indication output provided by the registered status validity indicating means thereof to the status validity receiving and detecting means of the other of said first and second units;

control means for enabling the writing into the corresponding status register thereof, the set of status data received from the other of said first and second units; and

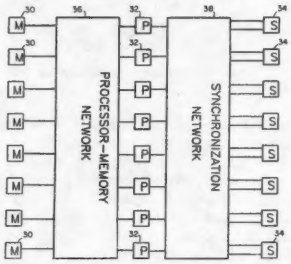
said control means of one of said first and second units responding to a valid status data set detection output of the status validity receiving and detecting means of said one unit for enabling the writing of the set of status data received from the other of said first and second units into the status register of said one unit.

4,989,131

TECHNIQUE FOR PARALLEL SYNCHRONIZATION

Harold S. Stone, Chappaqua, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 26, 1988, Ser. No. 224,846
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—200 **16 Claims**



1. A computing system comprising:

a plurality of data processors, each of which includes means for issuing a synch instruction for purposes of synchronizing certain ones of said processors that are issuing a same synch instruction for indicating that a common variable is to be processed;

a plurality of synchronizers, each of which has two inputs for receiving first and second synch instructions, respectively, from a first processor and from a second processor, respectively, of said plurality of data processors, each of said synchronizers including means for comparing the synch instructions received at the two inputs to determine equality of same, each of said synchronizers further including means, responsive to said comparing means determining that the first and the second synch instructions are equal, for signalling said first processor to continue processing said common variable for itself and for said second processor, and further including means, responsive to said comparing means determining that the first and the second synch instructions are equal, for signalling said second processor to suspend processing said common variable; and

means for said first processor to inform said second processor of the results of the processing of said common variable for said second processor.

4,989,132

OBJECT-ORIENTED, LOGIC, AND DATABASE PROGRAMMING TOOL WITH GARBAGE COLLECTION

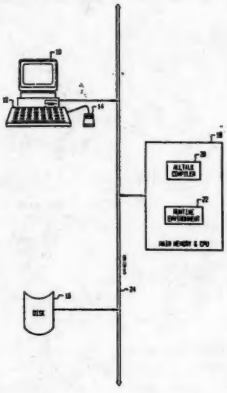
Fredric H. Mellender, Rochester; Andrew G. Straw, Fairport, and Stephen E. Riegel, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

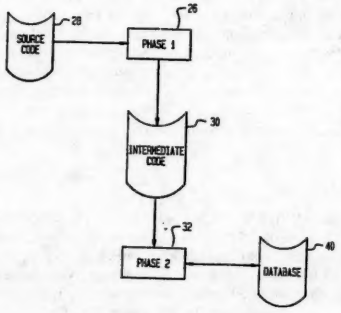
Filed Oct. 24, 1988, Ser. No. 261,791
Int. Cl.[5] G06F *7/00*
U.S. Cl. 364—200 **33 Claims**

1. A program tool, comprising

a. a workstation having an operator interface, a mass memory, a CPU, and main memory;

b. an object oriented programming language system including,
(1) an object oriented programming language, and
(2) object oriented language compiler means for translating source code written in the object oriented programming language into objects and interpreter code;
c. a logic programming language system, having components representing terms, clauses, predicates, atoms, and variables, including,
(1) a logic programming language, and
(2) logic compiler means for translating source code written in the logic programming language into objects;
d. a database residing in said mass memory, for storing objects and components of a logic programming language as objects in a common data structure format, applications data, and applications stored as compiled interpreter code;
e. object database management for representing objects and components of a logic program in said common data structure format as objects, and responsive to calls for retrieving and storing such objects in said database, and for automatically deleting objects from said data base when they become obsolete;
f. interpreter means for executing said interpreter code and generating calls to said database management means; and
g. logic subsystem means for solving logic queries, said logic subsystem means treating any object as a term in the logic programming language.



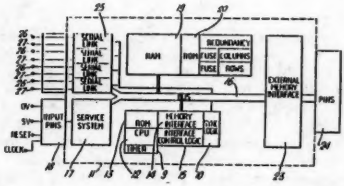


4,989,133

SYSTEM FOR EXECUTING, SCHEDULING, AND SELECTIVELY LINKING TIME DEPENDENT PROCESSES BASED UPON SCHEDULING TIME THEREOF

Michael D. May, and Roger M. Shepherd, both of Bristol, United Kingdom, assignors to Inmos Limited, Bristol, England

Continuation of Ser. No. 897,061, Jul. 18, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 274,741
Int. Cl.[5] G06F *9/44*
U.S. Cl. 364—200 **51 Claims**



37. A microcomputer comprising a timer, memory and a processor configured to execute a plurality of concurrent processes by said processor in accordance with a plurality of program steps, at least some of said processes being time dependent, said time dependent processes including time-related instructions, said time-related instruction including a time value relative to said timer, the microcomputer including a scheduling system comprising:

(i) an addressable storage element for indicating a process which is being executed by said processor, said process being referred to as the current process;

(ii) a timer list coupled to said storage element for identifying one or more processes which form a time-ordered collection awaiting execution by said processor after respective specified scheduling times for the processes in said collection;

(iii) a set of storage locations associated with said timer list for indicating said specified scheduling times when the processes in said collection become ready for execution;

(iv) a control system coupled to said timer list and to said processor to cause said processor to add said current process to said collection at a time-ordered position between a preceding process having an earlier scheduling time and a following process having a later scheduling time;

(v) a next process indicator to indicate the next process in said time-ordered collection for execution by said processor; and

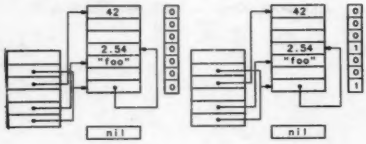
(vi) a program stage indicator for each concurrent process; said processor including timing logic responsive to said next process indicator to make said next process the current process for execution after its scheduling time occurs whereby when said processor executes a time-related instruction, said processor compares said time value in said time-related instruction to the time indicated by said timer, and, in response to said time value in said time-related instruction having arrived in said timer, continuing execution of said current process; in response to said time value in said time related instruction having not arrived, stopping execution of the current process and causing said control system to add said current process to said collection.

4,989,134

METHOD AND APPARATUS FOR ENHANCING DATA STORAGE EFFICIENCY

Robert A. Shaw, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 20, 1987, Ser. No. 28,808
Int. Cl.[5] G06F *12/12*
U.S. Cl. 364—200 9 Claims



1. A method for enhancing data storage efficiency in a virtual memory system including a primary memory and a secondary memory having a plurality of pages where a base set and a heap reside within pages of said primary memory and said secondary memory, and a primary memory dirty page map of said primary memory which indicates when pages in said primary memory have been written to; said method comprising the steps of:

developing a secondary memory dirty page map of said secondary memory;

developing a saved state map from said primary memory dirty page map;

utilizing said primary memory dirty page map and said secondary memory dirty page map to determine which pages within the base set have not been written to since said dirty page maps were last cleared, thereby effectively reducing the size of said base set which needs to be utilized by a garbage collection routine by allowing the garbage collection routine to ignore any page in the base set which has not been written to;

performing said garbage collection routine on at least a segment of said heap based upon said effectively reduced base set; and

performing a virtual memory routine including writing a first page from said secondary memory to a first page in said primary memory utilizing both said primary dirty page map and said saved state map to determine whether or not said first page in said primary memory first needs to be saved to a second page in said secondary memory because it had been written after it came into primary memory.

4,989,135

COMMUNICATION CONTROL MICROCOMPUTER

Sakae Miki, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 156,313, Feb. 16, 1988. This application Jun. 5, 1990, Ser. No. 534,350
Claims priority, application Japan, Feb. 16, 1987, 62-31456
Int. Cl.[5] G06F *3/00, 13/00*
U.S. Cl. 364—200 17 Claims

1. A communication interface apparatus comprising:

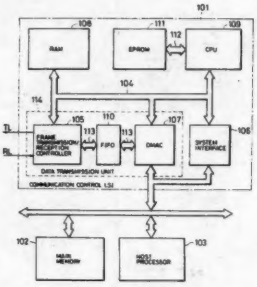
a means for receiving serial data from a first associated external device and converting the received serial data into parallel data for processing in a host system;

a means for converting processed parallel data of the host system into serial data and transmitting the serial data to the first associated external device;

a means for controlling the reception of serial data from the first associated external device to produce reception status signals and interrupt signals and for controlling the transmission of serial data to the first associated external device to produce transmission status signals and interrupt signals, the controlling means being operatively connected to the receiving and converting means and converting and transmitting means wherein said means for controlling the reception and transmission of serial data includes a first detecting means for selectively detecting a first end of data indicator and a second means for selectively generating a second end of data indicator, the second means being operatively connected to the receiving and converting serial data means, and the first detecting means being operatively connected to the converting and transmitting serial data means;

a first storing means for storing the converted parallel data transferred from the receiving and converting serial data means and for storing the processed parallel data transferred from a host system main memory; and,

a means for controlling the transfer of the converted parallel data from the first storing means to the main memory, and



for controlling the transfer of the processed parallel data from the main memory to the first storing means, the transfer controlling means being operatively connected to the means for controlling the reception and the transmission of the serial data and the first storing means, the transfer controlling means including a third means for selectively generating the first end of data indicator and a fourth means for selectively detecting the second end of data indicator, the third means being operatively connected to the first detecting means, the fourth means being operatively connected to the second means, wherein the transfer controlling means terminate transfer of the converted parallel data from the first storing means to the main memory upon receiving a signal from the second means when a second end of data indicator has been detected.

4,989,136

DELAY MANAGEMENT METHOD AND DEVICE

John R. Gurd, Manchester, United Kingdom, and Katsura Kawakami, Yokohamasi Kanagawaken, Japan, assignors to The Victoria University of Manchester, Manchester, England and Matsushita Electrical Industrial Co., Ltd., Osaka, Japan

Filed May 28, 1987, Ser. No. 56,475
Claims priority, application United Kingdom, May 29, 1986, 8613068
Int. Cl.[5] G06F *3/00;* H04J *3/24*
U.S. Cl. 364—200 5 Claims

1. A delay management method for a computer system comprising a processing device, a memory section including a main memory and a free address memory, means for transmitting write instructions from the processing device to the memory section, each of the write instructions including an item of data and identifying an address of the main memory into which the item of data is to be written, means for transmitting read instruction from the processing device to the memory section, each of the read instructions identifying an address of the main memory from which an item of data is to be read out to the processing device, and a delay management section including a

delay management memory for delaying premature read instructions which identify addresses of the main memory into which the item of data to be read out has not yet been written, the method of comprising the steps of:

(a) transmitting, from the delay management section to the memory section, free address data including address identifiers identifying free addresses in the delay management memory,

(b) storing the free address identifiers in the free address memory,

(c) detecting premature read instructions with detecting means and storing, at the address of the main memory identified by a detected premature read instruction, an identifier of an address of the delay management memory selected from the address identifiers stored in the free address memory,

(d) deleting the selected address identifier from the free address memory,

(e) generating a delay token with delay token generating means when a premature read instruction is detected, the delay token including the selected address identifier and information identifying the detected premature read instruction and any previously selected delay management memory address identifier replaced by the selected address identifier in the address of the main memory identified by the detected premature read instruction,

(f) transmitting the delay token from the memory section to the delay management section,

(g) storing, at the address identified by the selected address identifier included in a delay token, the identifying information included in the delay token, whereby the stored identifying information links together any two or more delay management memory addresses storing information related to premature read instructions directed to the same main memory address,

(h) generating a release request token with release request token generating means when a write instruction causes an item of data included in the write instruction to replace an identifier of an address of the delay management memory in an address of the main memory identified by the write instruction, the release request token including an identifier of the address into which the item of data is written and the replaced delay management memory address identifier,

(i) transmitting the release request token from the release request token generating means to the delay management section,

(j) generating read instruction tokens with read instruction token generating means in response to receipt, by the delay management section, of release request token being a read instruction token being generated in respect of the address of the delay management memory for which an identifier is included in the release request token and any the previously selected address linked thereto by the stored information,

(k) transmitting the read instruction tokens with read instruction token transmitting means to the memory section to cause the delayed premature read instructions to be executed, and

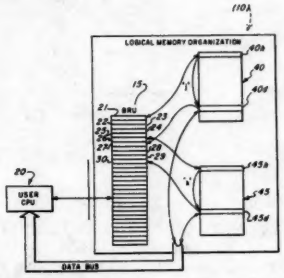
(l) transmitting a free address token from the delay management section to the memory section in respect of each address of the delay management memory from which a read instruction token has been generated.

4,989,137

COMPUTER MEMORY SYSTEM

Donald W. Oxley, Carrollton; Glenn E. Manuel, Dallas; William M. Knight, Jr., Plano, and Jeri J. Loafman, Carrollton, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 12, 1984, Ser. No. 630,476
Int. Cl.[5] G06F *12/06*
U.S. Cl. 364—200 **14 Claims**



1. A memory system for association with a user processor, comprising:

a physical memory;

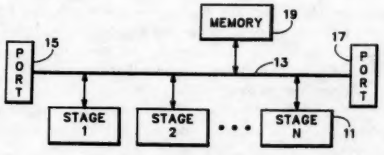
and means for interfacing the physical memory to the user processor so that the physical memory appears to the user processor as a binding register by which blocks of length arbitrarily allocatible by the user processor must be accessed for reading and writing information by the user processor, wherein the user processor communicates with the memory blocks by specifying a register of the binding register to identify an associated block and a relative index to a location within the black.

4,989,138

SINGLE BUS GRAPHICS DATA PROCESSING PIPELINE WITH DECENTRALIZED BUS ARBITRATION

Pierre A. Radochonski, Lake Oswego, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 239,875, Sep. 2, 1988, abandoned. This application May 14, 1990, Ser. No. 522,508
Int. Cl.[5] G06F *9/38, 13/16*
U.S. Cl. 364—200 **8 Claims**



1. A data processing system implementing a sequence of data processing operations, comprising:

a bus for conveying data, an address and a bus arbitration signal;

a plurality of data processing stages connected to said bus for receiving the data, address and arbitration signal conveyed by the bus,

each stage comprising processing means for performing a separate data processing operation of said sequence by producing output data and addresses in response to input data received on said bus, output data produced by each of said stages other than a stage performing a last operation of said sequence being provided as input data to another of said stages via said bus, and,

each stage further comprising bus master means responsive to requests from said processing means of the same said

stage for monitoring said bus arbitration signal to determine when said bus is not in use by another stage, and for setting said bus arbitration signal to indicate said bus is in use wherein said bus arbitration signal is transmitted on said bus for reception by another of said data processing stages via said bus, transmitting output data and addresses on said bus, and thereafter setting said bus arbitration signal to indicate said bus is not in use, such that said bus master means in said plurality of data processing stages provides decentralized bus arbitration for use of said bus.

4,989,139

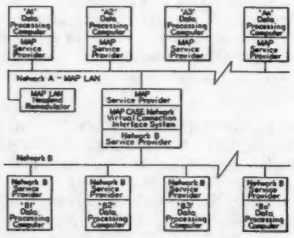
MAP CASE NETWORK VIRTUAL CONNECTION INTERFACE SYSTEM

Robert M. Friedman, Los Altos, Calif.; Grayson W. Randall, Vestal, N.Y.; Richard J. Sheftic, and David P. Spencer, both of Endwell, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 75,004, Jul. 17, 1987, abandoned. This application Jan. 19, 1990, Ser. No. 467,333

Int. Cl.[5] G06F *13/00, 15/16*

U.S. Cl. 364—200 **2 Claims**


"A1" Data Processing Computer
"A2" Data Processing Computer
"A3" Data Processing Computer
"An" Data Processing Computer
MAP Service Provider
Network A - MAP LAN
MAP LAN Headend Remodulator
MAP Service Provider
MAP CASE Network Virtual Connection Interface System
Network B Service Provider
Network B
"B1" Data Processing Computer
"B2" Data Processing Computer
"B3" Data Processing Computer
"Bn" Data Processing Computer

1. A system for establishing a communication connection for the transfer of information between a real MAP network of data processing computers and a real non-MAP connection-oriented network of data processing computers, wherein each of said data processing computers in each network is a type of electronic digital computing machine that can execute collections of user created instruction programs, and can be connected to a local area network, so that said programs can communicate with other programs in other data processing computers, said system comprising:

each data processing computer in each of said networks being connected to execute predetermined user created data programs;

interface means to establish a Virtual MAP CASE connection path between a computer in said MAP network and a computer in said non-MAP connection-oriented network, in response to a request from either computer, in accordance with a State Table in FIG. 3 of the drawings;

said interface means being adapted to manage information transfer between said computers over said Virtual MAP CASE connection path in accordance with said State Table in FIG. 3 of the drawings;

so that said Virtual MAP CASE connection path presents the appearance of a real MAP connection path for the transfer of said information.

4,989,140

SINGLE CHIP PIPELINE DATA PROCESSOR USING INSTRUCTION AND OPERAND CACHE MEMORIES FOR PARALLEL OPERATION OF INSTRUCTION CONTROL AND EXECUTIONS UNIT

Tadahiko Nishimukai, Sagamihara; Atsushi Hasegawa, Koganei; Kunio Uchiyama, Hachioji; Ikuya Kawasaki, Kodaira, and Makoto Hanawa, Kokubunji, all of Japan, assignors to Hitachi, Ltd. and Hitachi Micro Computer Engineering Ltd., both of Tokyo, Japan

Continuation of Ser. No. 840,433, Mar. 17, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 323,125

Claims priority, application Japan, Mar. 15, 1985, 60-50512

Int. Cl.[5] G06F *9/312, 9/34, 12/10, 13/16*

U.S. Cl. 364—200 **48 Claims**

1. A single chip pipeline data processor for use with a main memory, in which operand data and instructions are stored, comprising:

an instruction decoder decoding instructions and generating decoded results;

an execution unit executing instructions in accordance with said decoded results;

an instruction address generator generating an instruction read demand signal and a logical instruction address;

an instruction cache memory coupled to said instruction address generator and storing a plurality of logical instruction addresses and instructions corresponding to said logical instruction addresses and generating an instruction hit signal when said logical instruction address supplied from said instruction address generator is present in said instruction cache memory, wherein said instruction hit signal inhibits access to main memory;

an operand address generator generating an operand fetch demand signal and a logical operand address signal;

an operand cache memory coupled to said operand address generator and storing a plurality of logical operand addresses and operand data corresponding to said logical operand addresses and generating an operand hit signal when said logical operand address supplied from said operand address generator is present in said operand cache memory, wherein said operand hit signal inhibits access to said main memory;

an interface selector coupled to said instruction address generator and to said operand address generator, receiving said generated logical instruction address and said generated logical operand address, responding to said instruction read demand signal, said operand fetch demand signal, said instruction hit signal and said operand hit signal, and sending out said generated logical instruction address in response to the absence of said instruction hit signal and sending out said generated logical operand address in response to the absence of said operand hit signal;

an address translator coupled to said interface selector translating said logical addresses into physical addresses to be sent to the main memory, whereby the instruction address and operand address sent to said main memory are physical addresses obtained from said address translator; and

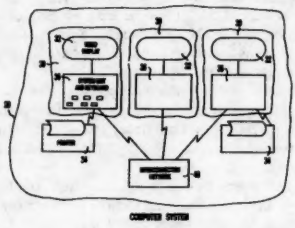
circuitry having first and second outputs coupled to said instruction cache memory and said operand cache memory respectively, and receiving produced by the execution unit data in response to execution of one of said instructions, said circuitry responsive to a first bit of said received data to provide a first clear signal on said first output, to a second bit of said received data to provide a second clear signal on said second output and to said first bit and second bit of said received data to provide first and second clear signals on said first and second outputs respectively, said one instruction belonging to instructions decoded by said instruction decoder and executed by said data processor.

4,989,141

COMPUTER SYSTEM FOR FINANCIAL ANALYSES AND REPORTING

Richard J. Lyons, West Hempstead; Kevin F. Nolan, Middle Village, both of N.Y., and Wah C. Chu, Fairfield, Conn., assignors to Corporate Class Software, Stamford, Conn.

Filed Jun. 1, 1987, Ser. No. 55,823
Int. Cl.[5] G06F *15/30*
U.S. Cl. 364—408 10 Claims



1. A method of operating on a computer a financial database in which financial data is organized in accordance with at least the attributes of time period, financial schedule and business entity to which such data pertains comprising the steps of:

defining in said computer the time periods in which said financial data is organized,

for each time period, defining in said computer the financial schedules and business entities in which said financial data is organized,

receiving financial data in the form of financial schedules of different business entities for defined periods of time, each of said schedules having one of a plurality of first formats,

creating for each different first format a template for conversion of financial data from said first format to a common second format,

storing with the aid of said templates financial data from the defined time periods, financial schedules and business entities in said second format in a database in said computer, said database being organized in accordance with said attributes of time period, financial schedule and business entity,

selecting financial data stored in said database for output from said database by generating a display of the different time periods, financial schedules and business entities for which financial data is stored in said database, and indicating to the computer by means of the display the time periods, financial schedules and business entities for which financial data is to be output from the database, and

generating an output from the database of the financial data for the time periods, financial schedules, and business entities selected by means of the display.

3. An apparatus for operating on a computer a financial database in which financial data is organized in accordance with at least the attributes of time period, financial schedule and business entity, to which such data pertains comprising:

means for defining in said computer the time periods in which said financial data is organized,

for each time period, means for defining in said computer the financial and business entities in which said financial data is organized,

means for receiving financial data in the form of financial schedules of different business entities for defined periods of time, each of said schedules having one of a plurality of first formats,

means for creating for each different first format a template for conversion of financial data from said first format to a common second format,

means for storing with the aid of said templates financial data from the defined time periods, financial schedules and business entities in said second format in a database in said computer, said database being organized in accordance with said attributes of time period, financial schedule and business entity,

means for selecting data stored in said database for output from said database comprising:

a display screen,

means for generating on the display screen a listing of the different time periods, financial schedules and business entities for which financial data is stored in said database, and

means for indicating to the computer by means of the display screen the time periods, financial schedules and business entities for which financial data is to be output from the database, and

means for generating an output from the database of the financial data for the time periods, financial schedules, and business entities selected by means of the display screen.

5. A method of generating in a computer a spreadsheet of financial information of the type used in financial schedules comprising the steps of:

storing said financial information in a first format in a storage means in which each of a plurality of financial data values is associated with a set of identifying attributes,

defining for each said financial data value a range value which identifies it,

generating a reference file which associated the financial data values stored in said storage means with individual cells of said spreadsheet, said reference file comprising coded headings for said spreadsheet which specify by range value and identifying attribute the financial data values to be located in the individual cells of the spreadsheet, and

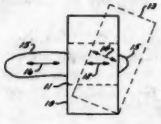
using said reference file and the financial data values stored in said storage means to generate the spreadsheet.

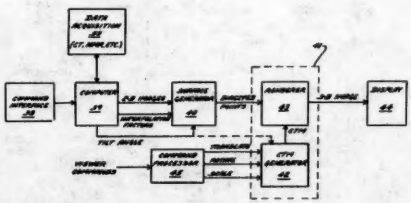
4,989,142

THREE-DIMENSIONAL IMAGES OBTAINED FROM TOMOGRAPHIC SLICES WITH GANTRY TILT

Carl R. Crawford, Milwaukee, Wis., assignor to General Electric Company, Milwaukee, Wis.

Filed Oct. 24, 1988, Ser. No. 261,534
Int. Cl.[5] A61B *6/03*; G06F *15/66*
U.S. Cl. 364—413.15 3 Claims





1. A method for generating a three-dimensional image of a surface within a body from a plurality of substantially parallel tomographic slices collected along an axis in said body, said method comprising the steps of:

acquiring said plurality of tomographic slices of said body such that each of said slices is inclined by a tilt angle A from an imaginary line perpendicular to said axis;

extracting a plurality of data elements which collectively define said surface from said slices such that said surface is geometrically distorted because of said tilt angle A;

generating said three-dimensional image of said surface from said plurality of data elements; and

performing a matrix transformation as part of said image generating step to remove said geometric distortion of said surface.

2. The method of claim 1 wherein said matrix transformation includes a shear matrix of the form:

$$\begin{vmatrix} 1 & 0 & 0 \\ 0 & \text{COS}(A) & -\text{SIN}(A) \\ 0 & 0 & 1 \end{vmatrix}$$

3. A method for generating a three-dimensional image of a surface within a body from a plurality of tomographic slices substantially parallel to an x-axis and collected along a z-axis in said body, said method comprising the steps of:

acquiring said plurality of tomographic slices of said body each at a respective location z_k along said z-axis, each slice being inclined by a tilt angle A from an imaginary line perpendicular to said z-axis; and

extracting said surface substantially without geometric distortion using a dividing cubes method for generating a plurality of subcubes for defining said surface, the location of each subcube within a large cube at coordinates (i,j,k) having y and z components determined according to:

$$y=\text{COS}(A)\text{PIXEL}_y(j+J\ \Delta_j) \text{ and}$$

$$z=z_k-\text{SIN}(A)\text{PIXEL}_y(j+J\ \Delta_j)+K\ \Delta_k[z_{k+1}-z_k]$$

where PIXEL_y is the spacing between slice data point in the y-direction perpendicular to said x-axis and said z-axis, Δ_j is the size of a subcube in said y-direction, J is the order of a subcube within its large cube, and z_k is the location of a slice bounding said large cube.

4,989,143

ADAPTIVE COHERENT ENERGY BEAM FORMATION USING ITERATIVE PHASE CONJUGATION

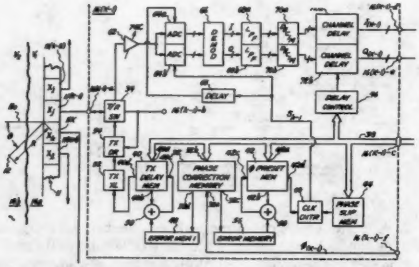
Matthew O'Donnell, Schenectady, N.Y., and Stephen W. Flax, Wauwatosa, Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 11, 1987, Ser. No. 132,079

The portion of the term of this patent subsequent to May 10, 2006, has been disclaimed.

Int. Cl.[5] G01N *29/00*

U.S. Cl. 364—413.25 **26 Claims**



1. A method for iterative adaptive reduction of phase aberration effects upon the time delays needed for focusing a beam of coherent energy within non-homogeneous media at a selected range R from, and at an angle θ with respect to the normal to, the surface of an array of a plurality N of transducers, with each transducer providing a portion of the energy of the beam when excited and for thereafter converting energy incident thereon to a signal, comprising the steps of:

(a) bouncing from scatterers, naturally contained in at least a portion of the media to be investigated, a probe originating from the plurality N of transducers;

(b1) converting a received signal from each transducer into a digital baseband data signal;

(b2) cross-correlating, for the first (N−1) channels, the digital baseband data signals converted form k-th transducer where $1 \leqq k \leqq (N-1)$, and an adjacent (k+1)-st transducer of the (N−1) successive pairs of adjacent ones of all N transducers to produce a phase conjugation correction signal $\Delta\phi_k$ from the k-th channel;

(c) arithmetically operating upon the plurality of phase conjugation correction signals $\Delta\phi_k$ to produce a time correction $\Delta t_{j\theta}$ for a time delay associated with an angle θ and a transducer j, where $1 \leqq j \leqq (N-1)$, for a probe beam at that range R;

(d) then modifying by the time correction $\Delta t_{j\theta}$ for the transducer j, both (1) the time delays for exciting a reduced aberration imaging beam in the non-homogeneous media and (2) the time delays for forming a reception beam from the media, with both beams steered substantially to angle θ and focussed substantially to range R;

(e) repeating the sequence steps (a)–(d) for at least one additional iteration; and

(f) then modifying, by a last-obtained time correction $\Delta t_{j\theta}$ for each transducer j, the time delay of both insonification to, and return signals received from, the media to be investigated, to reduce phase aberration in data gathered for generating a displayable image of the media.

4,989,144

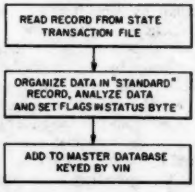
METHOD AND SYSTEM FOR IDENTIFYING AND DISPLAYING DISCREPANCIES IN VEHICLE TITLES

Ewin H. Barnett, III, Ashland, Mo., assignor to Carfax, Inc., Columbia, Mo.

Continuation-in-part of Ser. No. 301,249, Jan. 24, 1989. This application Mar. 7, 1989, Ser. No. 320,231

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—419 **17 Claims**


READ RECORD FROM STATE TRANSACTION FILE
ORGANIZE DATA IN "STANDARD" RECORD, ANALYZE DATA AND SET FLAGS IN STATUS BYTE
ADD TO MASTER DATABASE KEYED BY VIN

1. A computer method for rapidly identifying and displaying discrepancies in vehicle titles comprising the steps of

(a) at intervals gathering recent title transaction data from a plurality of sources indexed by vehicle identification number, said data from different sources having common and different data elements and being organized differently,

(b) adding records to a master database having a plurality of transaction standard variable format records indexed by vehicle identification number,

(c) selecting all records indexed by the same vehicle identification number,

(d) identifying the discrepancies inherent in the individual transaction records selected,

(e) identifying the contextual discrepancies which may be determined by comparison of transaction records indexed by the same vehicle identification number, and

(f) displaying the title transactions and discrepancies, if any, identified in steps (d) and (e).

4,989,145

SYNTAX ANALYSIS AND LANGUAGE PROCESSING SYSTEM

Ichiro Kyushima, Yokohama, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 18, 1989, Ser. No. 408,750
Claims priority, application Japan, Sep. 19, 1988, 63-232376
Int. Cl.[5] G06F 11/00
U.S. Cl. 364—419 14 Claims

1. A syntax analyzing method in a language processing system comprising the steps of:

(a) receiving a sequence of symbols;

(b) analyzing lexicons of the sequence of symbols;

(c) storing indentation information of each lexicon in a memory;

(d) analyzing syntax of the sequence of symbols, in accordance with a result achieved in step (b) to determine a presence of a syntax error; and

(e) upon detection of a syntax error in step (d), completing the steps of,

(i) generating at least one proposed sequence of symbols corresponding to a portion of the sequence of symbols which include the syntax error in accordance with indentation information stored in the memory, and

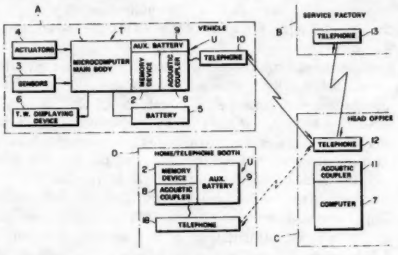
(ii) selecting one of the at least one proposed sequence of symbols in accordance with an indentation rule table.

4,989,146

AUTOMOTIVE TROUBLE DIAGNOSING SYSTEM

Minori Imajo, Yokohama, Japan, assignor to Nissan Motor Company, Ltd., Japan

Filed Oct. 20, 1985, Ser. No. 783,235
Claims priority, application Japan, Oct. 8, 1984, 59-209699
Int. Cl.[5] G06F 15/74; G01M 15/00
U.S. Cl. 364—424.04 16 Claims



1. In an automotive vehicle, the improvement comprising:

computing means onboard the vehicle, said computing means powered by an automotive battery of the vehicle, memory means connected to the computing means for storing data from sensing means in the vehicle;

detachable unit means, including said memory means, coupling means for coupling said memory means to a remote computing means operable for remotely determining service and parts required for correction of a diagnosed problem of the vehicle, and auxiliary battery means for powering said memory means and said coupling means;

said detachable unit means including a plurality of contact points for connection to said computing means onboard the vehicle, including a contact point for charging said auxiliary battery from the automotive battery of the vehicle;

first means for producing electric signals relatable to the diagnosed problem of the automotive vehicle;

said memory means being further operable for memorizing said electrical signals;

second means for pre-diagnosing and indicating a possibility of occurrence of said problem in response to said electric signals memorized in said memory means; and

said coupling means including an acoustical coupler electrically connected to said memory means to convert said electric signals to acoustic signals, said acoustic signals transmitted via a telephone line to a computer in said remote computing means and located remote from said automotive vehicle, said computer being arranged to diagnose the problem of said automotive vehicle in response to said acoustic signals.

4,989,147

LINE PRESSURE CONTROL DEVICE FOR AUTOMATIC TRANSMISSION

Shigeru Ishii, Atsugi, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 22, 1989, Ser. No. 314,340
Claims priority, application Japan, Mar. 1, 1988, 63-45736
Int. Cl.[5] G06F 15/20; G60K 41/18
U.S. Cl. 364—424.1 6 Claims

6. In a vehicle

an engine;

a throttle valve, said throttle valve being operatively diposed in an induction system of said engine;

an idling switch, said idling switch being arranged to the be closed and produce a signal when said throttle valve assumes a fully closed position;

a throttle valve position sensor, said throttle valve position sensor being operatively connected with said throttle valve and arranged to produce a voltage signal which varies with the position of the throttle valve;

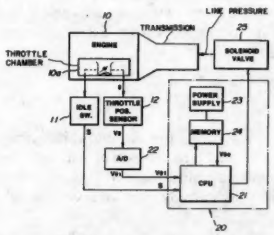
an A/D converter, said A/D converter being operatively connected with said throttle valve position sensor for converting the analog type voltage signal produced thereby into a digital signal;

a transmission operatively connected with said engine, said transmission including hydraulically operated friction elements;

line pressure control means, said line pressure control means being arranged to control the hydraulic line pressure with which the hydraulically operated friction elements are operated;

a control circuit;

memory means, said memory means being included in said control circuit;



a line pressure control schedule, said control schedule being stored in said memory means, said line pressure control schedule being recorded in terms of line pressure and throttle position;

a processing unit, said processing unit being included in said control circuit and arranged to receive input date from said idle switch and said A/D converter, said processing unit comprising:

means for correcting the control schedule in accordance with said input data in a manner wherein when the idle switch is on indicating the throttle valve is fully closed, the memorized voltage value which corresponds to a fully closed position in the control schedule is compared with that indicated by said throttle position sensor and in the event that a difference exists, the memorized value is incrementally changed by predetemined incremental values at a predetermined rate until the memorized value corresponds to the output of the throttle valve sensor.

4,989,148

APPARATUS FOR THE COMPUTER-ASSISTED CONTROL OF VIBRATION DAMPERS OF A VEHICULAR SUSPENSION SYSTEM AS A FUNCTION OF THE ROADWAY

Reinhard Gürke, Windeck-Halscheid, and Berthold Altwicker, Windeck-Dattenfeld, both of Fed. Rep. of Germany, assignors to Boge AG, Eitorf, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 330,334

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1988, 3810638

Int. Cl.[5] B60G *17/00*

U.S. Cl. 364—424.05 **15 Claims**

10. A suspension system for a vehicle, said vehicle including a vehicle body and a vehicle wheel, said suspension system comprising:

adjustable vibrational damping means for applying a vibrational damping action between said vehicle body and said vehicle wheel and for varying at least one characteristic of said applied vibrational damping action in response to a vibrational damping control signal;

vehicle body accelerometer means for sensing an acceleration representative of the vehicle body and for generating at least one signal representative thereof;

vehicle wheel accelerometer means for sensing an acceleration representative of the vehicle wheel and for generating at least one signal representative thereof;

signal processing means for processing said at least one signal representative of said vehicle body acceleration and said at least one signal representative of said vehicle wheel acceleration and for generating therefrom said vibrational damping control signal;

said signal processing means comprising differentiating means for generating a differentiation signal representative of the rate of change with respect to time of at least one of said at least one signal representative of said vehicle body acceleration and said at least one signal representative of said vehicle wheel acceleration;

said signal processing means further comprising means for determining the velocity and direction of travel of said vehicle wheel based on said vehicle wheel acceleration; means for determining the velocity and direction of travel of said vehicle body based on said vehicle body acceleration; testing means for testing if the following two conditions are fulfilled:

$$|V_{wheel}| \cong |V_{body}|?; \text{ and} \quad (a)$$

$$E_{body} = E_{wheel}?; \quad (b)$$

$|V_{wheel}|$ and $|V_{body}|$ being the absolute values representative of the velocities of said vehicle wheel and said vehicle body, respectively, and wherein E_{body} and E_{wheel} are the direction of travel of said vehicle body and said vehicle wheel, respectively;

said signal processing means still further comprising means for generating a signal I_1 proportional to a product of at least three intermediate signals U_0, U_1 and U_2 which are representative of the absolute values of said differentiation signal, said vehicle body acceleration and said wheel acceleration, respectively;

said signal processing means still further comprising means for generating a signal I_2 indicative of said absolute value of said wheel acceleration and means for altering said vibrational damping control signal by an amount corresponding to said indicative signal I_2; and

wherein said signal processing means further comprises means for generating a reference signal I_0 such that:

said reference signal I_0 is reduced by an amount corresponding to said indicative signal I_2 and;

if, and only if, either of said conditions (a) and (b) is negative, said reference signal I_0 is further reduced by an amount corresponding to said proportional signal I_1.

4,989,149

CONSTANT-SPEED RUNNING APPARATUS FOR VEHICLE

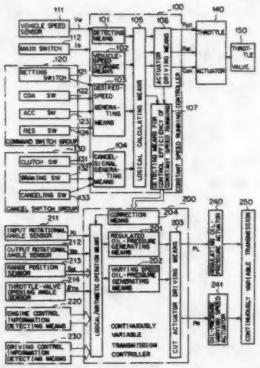
Munehiko Mimura; Takumi Tatsumi; Yasuo Naito, and Kazuyori Katayama, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,860

Claims priority, application Japan, Jul. 2, 1987, 62-167176

Int. Cl.[5] B60K *31/02, 41/18;* **G05D** *13/00*

U.S. Cl. 364—426.04 **7 Claims**



1. A speed control and transmission ratio control apparatus for a vehicle comprises:

a continuously variable transmission (CVT) mounted in a power transmission path of a vehicle engine;

a throttle actuator for controlling a throttle-valve opening angle of said engine;

a constant-speed running controller for supplying said throttle actuator with electrical signals in order to perform constant-speed running of a vehicle of the basis of an actual vehicle-speed and a driving condition set by a driver, wherein said controller has a detecting means for a control efficiency of a constant-speed driving for detecting an acceleration demands by the driver; and

a continuously variable transmission controller for controlling a transmission-ratio of said CVT on the basis of respective input information of the vehicle, wherein said CVT controller has a correction means for calculating a vehicle acceleration on the basis of the transmission-ratio and an engine torque when the acceleration demand by the driver is detected by the detecting means for the control efficiency of the constant-speed running, and then calculating said transmission-ratio corresponding to a target vehicle acceleration force on the basis of said vehicle acceleration and thereby correcting said transmission-ratio of said CVT on the basis of the transmission-ratio according to a target vehicle acceleration force.

4,989,150

INJECTOR DIAGNOSIS SYSTEM

Kazuyuki Tazawa, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1990, Ser. No. 483,862

Int. Cl.[5] B60K *41/02*

U.S. Cl. 364—431.03 **5 Claims**

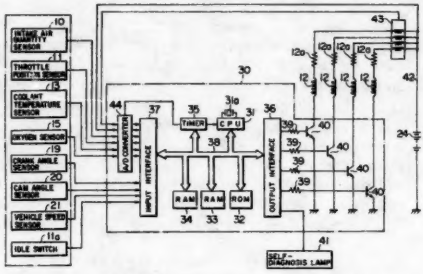
1. An injector diagnosis system for a motor vehicle having an injector circuit including a plurality of injectors mounted on an engine and a control unit for applying a pulse signal to each of the injectors to inject fuel into the engine at a certain timing, comprising:

detecting means for detecting a current flow through one of the injectors to which said pulse signal is applied;

calculating means for calculating the load current of the injector on the basis of the current detected by the detecting means;

setting means for setting a reference current;

diagnosis means for determining an error of the injector circuit when said load current differs from said reference current;



sensing means for sensing operating conditions of the engine;

judging means responsive to said operating conditions for judging a fuel cut condition of the engine; and

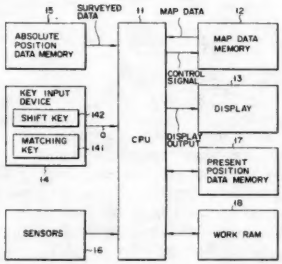
instruction means responsive to said fuel cut condition for stopping the determination of said diagnosis means, so as to prevent the judging means from erroneous judgement at the fuel cut condition.

4,989,151

NAVIGATION APPARATUS AND MATCHING METHOD FOR NAVIGATION

Yoshimi Nuimura, Gyoda, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 17, 1989, Ser. No. 311,831
Claims priority, application Japan, Feb. 23, 1988, 63-40170
Int. Cl.[5] G06F *15/50*
U.S. Cl. 364—449 **12 Claims**



1. A navigation apparatus which is carried on a vehicle, computes present positions of the vehicle, and visually presents the computed present positions, comprising:

map data storing means for storing data of a map to be displayed, said map including at least one reference point, said map data storing means storing surveyed data corresponding to said reference point, the surveyed data being data which indicates a previously determined absolute position of the reference point;

sensor means for sensing at least a speed and moving direction of the vehicle, said sensor means including a speed sensor and a direction sensor;

position calculating means for calculating present position data representing a present position of the vehicle on the basis of the data collected by said sensor means;

display means for displaying a map based on the map data stored in said map data storing means, and for displaying the present position of the vehicle as a mark overlaid on the displayed map, based on the present position data calculated by said calculating means;

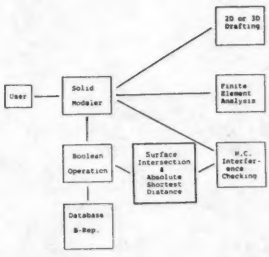
key-in means for generating a passing signal indicating that the vehicle has actually passed said reference point, through operation of a predetermined key; and position correcting means includes first correcting means for, when receiving said passing signal, comparing the surveyed data of a plurality of reference points stored in said map data storing means with the present position data calculated by said position calculating means, selecting the surveyed data of a reference point of which the surveyed data corresponds to the smallest difference between the reference point and the present position data, and correcting said present position data so that it corresponds to said selected surveyed data.

4,989,152

METHOD OF FINDING THE SURFACE INTERSECTIONS AND THE SHORTEST DISTANCE BETWEEN TWO ARIBTRARY SURFACES

Koun-Ping Cheng, P. O. Box 9364, Rancho Santa Fe, Calif. 92067

Filed Nov. 21, 1988, Ser. No. 274,421
Int. Cl.[5] G06F *15/46*
U.S. Cl. 364—474.24 **9 Claims**



1. A method of using a solid geometric modeling system for finding all the intersection curves of two surfaces to support different functions performed by the system, said method comprising the steps of:

(a) inputting to a CPU two surfaces of a solid geometric modeling system, a set of intersection curves SCr, r=0,1, . . . , of the said surfaces, a set of points SPq, q=0,1, . . . , of an initial position of a NC cutter;

(b) said CPU defining one of the said surface as a master surface S1 and the other said surface as a slave surface S2;

(c) said CPU constructing a vector field VF on the uv-plane of the said master surface S1 where VF is said to be the induced vector field of the orthogonal components of the equal height curves from the said master surface S1 to said slave surface S2;

(d) when said input curve set SCr is empty, said CPU performing steps (e), (f) and (g);

when said input curve set SCr is not empty, for each said curve SCr and CPU skip steps (e), (f) and (g);

(e) when the said input point set SPq is empty, said CPU construct a set of points SPq, q=1,2, . . . , on the uv-plane of said surface S1;

said CPU finding an initial intersection pair (P,Q) or relative minimum pair (P,Q) of said surface S1 and S2 by marching along a set of integral curves of the said vector field VF which pass through the said points SQq, q=1,2, . . . , or marching along the boundary lines of the uv-plane of the said surface S1;

(f) said CPU calculating an intersection curve SC by using the said intersection pair (P,Q), if said (P,Q) is found in (d);

(g) said CPU calculating an equal height curve EH around

P, by using the said minimum pair (P,Q), if said (P,Q) is found in (d);

(h) said CPU calculating the initial points IPi, i=1,2, . . . on the said intersection curve Sc or on the said equal height curve EH:

(i) said CPU finding other intersection pairs (Pj, Qj), j=1,2, . . . , or relative minimum pairs (Pk, Qk), k= 1,2, . . . , of said surface S1 and said surface S2 by marching along the connecting curves of the said vector field VF starting at the said point IFi;

(j) said CPU calculating new intersection curves SCm, m=1,2, . . . , or new equal height curves EHn, n=1,2, . . . , by using the said intersection pairs (Pj, Qj) or said minimum pairs (Pk, Qk);

(k) for each said intersection curve SCm or said EHn, said CPU repeating steps (h), (i) and (j) until no new intersection curves can be found;

(l) said CPU marching along the boundary of the uv-plane of the said surface S1 or the said surface S2 and calculating the intersection pairs (BPa, QPa), a=1,2, . . . , or the relative minimum pairs (BPb, BPb), b=1,2, . . . , of the said surfaces S1 and S2;

(m) said CPU calculating new intersection curves by using the said intersection pairs (BPa, BQa) found in step (1);

(n) said CPU using the said initial position of the cutter to select a correct curve from the said intersection curves found in steps (d)–(m) to generate a NC tool path; and

(o) creating NC data from the said tool path for driving the said cutter

(p) machining said surface S1 in accordance with said created NC data; and

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4,989,153

PERFECTED SINTERING MACHINE AND METHOD OF OPERATION

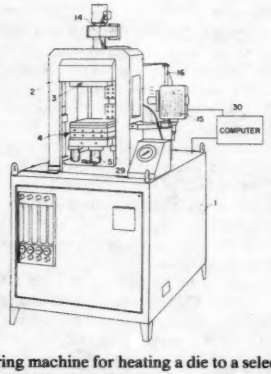
Giuseppe Bonvini, Piacenza, Italy, assignor to Sintris S.r.L., Piacenza, Italy

Filed Aug. 19, 1988, Ser. No. 233,728

Claims priority, application Italy, Sep. 11, 1987, 44810 A/87

Int. Cl.[5] **G06F** *15/46;* **B21J** *1/06;* **B22F** *33/02*

U.S. Cl. 364—477 **11 Claims**



1. A sintering machine for heating a die to a selected temperature and for subjecting the die to a selected pressure for sintering material in the die, comprising:

a pair of plate sets for retaining a die therebetween;

drive means connected to at least one of the plate sets for moving the plate sets together along a single axis to apply pressure to a die retained between the plate sets along the single axis only;

heating means connected to the plate sets for heating a die retained between the plate sets;

temperature detecting means for sensing the temperature of a die retained between the plate sets;

position sensing means operatively connected to the at least one plate set for sensing the position of the at least one plate set;

pressure sensing means for sensing the pressure being exerted by the plate sets on a die retained between the plate sets and along the single axis; and

electronic system means connected to said drive means, heating means, temperature detecting means, position sensing means and pressure sensing means for controlling the operation of said drive means and said heating means on the basis of temperature, position and pressure values supplied to said electronic system means by said temperature detecting means, position sensing means and pressure sensing means respectively, for discontinuously increasing the temperature and pressure in steps at selected intervals until the selected temperature and selected pressure are reached.

4,989,154

METHOD OF MEASURING RESISTIVITY, AND APPARATUS THEREFOR

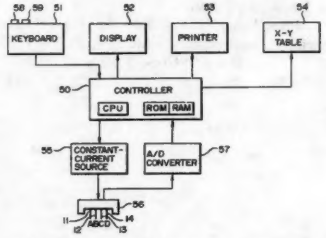
Masato Yamashita, Hitachi; Hideo Enjyouji, Tokyo; Hiroshi Kurihara, Yokkaichi; Shoji Yamaguchi, Yokkaichi; Hideto Shimizu, Yokkaichi; Nichio Hashizume, and Yasusuke Mori, both of Hiratsuka, all of Japan, assignors to Mitsubishi Petrochemical Company Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,988

Claims priority, application Japan, Jul. 13, 1987, 62-106344[U]; Aug. 19, 1987, 62-204085; Jan. 19, 1988, 63-4153[U]

Int. Cl.[5] **G01R** *27/00*

U.S. Cl. 364—482 **7 Claims**



1. Apparatus for measuring surface resistivity of a sample with a four-point probe, comprising:

a four-point probe having four electrodes to contact with said sample, two outer electrodes of said four electrodes to be contacted on said sample for passing a predetermined current (I) and two inner electrodes of said four electrodes for detecting a potential difference (V) produced by said current;

input means for inputting (i) shape information specifying whether said sample is rectangular or circular, (ii) information specifying dimensions and thickness (t) of said sample, and (iii) information indicating a measurement position of said four-point probe on said sample;

a ROM arranged for memorizing calculation procedures of first and second correction coefficients using each of a first equation which is

$$F^{-1} = \frac{y_B - y_C}{a} +$$

$$\sum_{m=1}^{\infty} \{G(\xi, x_A, x_B, x_C, y_A, y_B, y_C) -$$

$$G(\xi, x_D, x_B, x_C, -y_D, -y_B, -y_C)\} +$$

-continued

$$\sum_{n=1}^{\infty} \{G, (\eta, 0, 0, 0, y_A, y_B, y_C) -$$

$$G(\eta, 0, 0, 0, -y_D, -y_B, -y_C)\} +$$

$$\sum_{m=1}^{\infty}\sum_{n=1}^{\infty} 2\{(\zeta\, x_A, x_B, X_C, y_A, y_B, y_C)\} -$$

$$G(\zeta\, x_D, x_B, x_C, -y_D, -y_B, -y_C)\}$$

wherein $G(P, Q, R, S, T, U, V) =$

$$\frac{2}{aP\sinh(bP)}\cos(\xi Q)\cosh P\left(\frac{b}{2}-T\right)\times$$

$$\left\{\cos(\xi R)\cosh P\left(\frac{b}{2}+U\right)-\right.$$

$$\left.\cos(\xi S)\cosh P\left(\frac{b}{2}+V\right)\right\}, \xi=\frac{m\pi}{a}, \eta=$$

$$\frac{n\pi}{t}, \zeta=(\epsilon^2+\eta^2)^{\frac{1}{2}},$$

wherein each of the coordinates (x_A,y_A), (x_B,y_B), (x_C,y_C), (x_D,y_D) represents a position of a corresponding one of the four electrodes respectively (a,b are dimensions of a rectangular sample), and

a second equation which is

$$F^{-1}=\frac{t}{2\pi}\left\{\frac{1}{d_{AB}}+\frac{1}{d_{BA'}}-\frac{1}{d_{BD}}-\frac{1}{d_{BD'}}-\right.$$

$$\frac{1}{d_{AC}}-\frac{1}{d_{CA'}}+\frac{1}{d_{CD}}+\frac{1}{d_{CD'}}+f(d_{AB})+f(d_{BA'})-$$

$$\left.f(d_{BD})-f(d_{BD'})-f(d_{AC})-f(d_{CA'})+f(d_{CD})+f(d_{CD'})\right\}$$

wherein, $f(x)=\sum_{n=1}^{\infty}\frac{2}{\sqrt{x^2+(2nt)^2}}$

$$d_{AB}=\sqrt{(x_A-x_B)^2+(y_A-y_B)^2}$$

$$d_{BA}=\sqrt{(x_A-x_B)^2+(y_A-y_B)^2}$$

$$d_{BD}=\sqrt{(x_B-x_D)^2+(y_B-y_D)^2}$$

$$d_{AC}=\sqrt{(x_A-x_C)^2+(y_A-y_C)^2}$$

$$d_{CA}=\sqrt{(x_A-x_C)^2+(y_A-y_C)^2}$$

$$d_{CD}=\sqrt{(x_C-x_D)^2+(y_C-y_D)^2}$$

$$d_{BA'}=\sqrt{(x_{A'}-x_B)^2+(y_{A'}-y_B)^2}$$

$$d_{BD'}=\sqrt{(x_B-x_{D'})^2+(y_B-y_{D'})^2}$$

$$d_{CA'}=\sqrt{(x_{A'}-x_C)^2+(y_{A'}-y_C)^2}$$

-continued

$$d_{CD'}=\sqrt{(x_C-x_{D'})^2+(y_C-y_{D'})^2}$$

$$x_{A'}=a^2\times x_A/(x_A^2+y_A^2)$$

$$y_{A'}=a^2\times y_A/(x_A^2+y_A^2)$$

$$x_D=a^2\times x_D/(x_D^2+y_D^2)$$

$$y_D=a^2\times y_D/(x_D^2+y_D^2)$$

wherein ("a" is a radius of a circular sample, each of the coordinates (x_A,y_A), (x_B,y_B), (x_C,y_C), (x_D,y_D) represents a position of a corresponding one of the four electrodes respectively;

resistance calculating means for calculating a resistance value (V/I) from a predetermined value of a current (I) and a potential difference (V);

a processor arranged for selecting one of said calculation procedures according to said shape information, and for calculating either said first or said second correction coefficient for said sample based on said dimensions, said thickness and said measurement position using the selected calculation procedure, and for calculating surface resistivity of said sample using an equation (F×V/I), wherein said F is said first or said second correction coefficient and V/I is said resistance value; and

output means for outputting said surface resistivity and said first or second correction coefficient as calculated by said processor.

4,989,155

INTELLIGENT POWER MONITOR

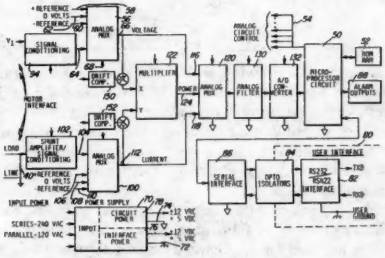
John D. Begin, Warren; James E. Berry, Royal Oak, and Paul D. Kretzmer, Oak Park, all of Mich., assignors to GTE Valenite Corporation, Troy, Mich.

Continuation of Ser. No. 896,416, Aug. 14, 1986, Pat. No. 4,839,819. This application Apr. 12, 1989, Ser. No. 337,080

The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.

Int. Cl.[5] **G06F** *15/46;* **G01R** *7/00*

U.S. Cl. 364—483 **4 Claims**



1. A method of monitoring a machine tool having a motor, the method comprising:

mounting a housing of a device in a motor control panel of a machine tool, said housing containing a pair of external terminals bridging a current shunt, at least one voltage input terminal, at least one alarm output connector, an analog multiplier circuit and a bidirectional communications interface connector, and said housing further including a programmable computer having a processor and a memory;

programming the memory from an external source through the communications interface connector so that the memory contains at least one limit value;

connecting the external terminals of the housing to a power line for the motor such that the current shunt is in series

with the motor and so that the voltage input terminal senses the voltage drop across the motor;

multiplying in said analog multiplier circuit a signal applied to the device housing associated with voltage and a signal associated with current thereby providing an analog output related to instantaneous power consumed by the motor;

converting the output of the multiplier to a digital representation of power;

comparing the digital representation of power with the programmed limit value in the memory; and

transmitting an output through the alarm output connector for altering machine operation if the detected instantaneous motor power exceeds the limit value.

4,989,156

METHOD OF DRAWING A PATTERN ON WAFER WITH CHARGED BEAM

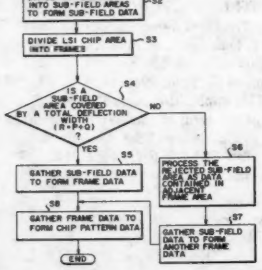
Osamu Ikenaga, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 274,688, Nov. 22, 1988, abandoned, which is a continuation of Ser. No. 896,960, Aug. 15, 1986, abandoned. This application May 16, 1990, Ser. No. 523,829

Claims priority, application Japan, Aug. 23, 1985, 60-185530

Int. Cl.[5] G06F *15/60*

U.S. Cl. 364—488 **3 Claims**



1. A method of drawing an IC pattern on a predetermined substrate with a charged beam, the IC pattern including at least a repetitive pattern block array having a plurality of same-sized continuous repetitive pattern blocks each having at least one same pattern and including at least one non-repetitive pattern block array including a plurality of different pattern blocks, comprising the steps of:

dividing a region of the substrate for forming the IC pattern into a plurality of subfield regions each including a reference position for the charged beam determined by a main deflection device of the charged beam, said subfield regions being determined by a subdeflection width of the charged beam;

dividing the region of the substrate into a plurality of virtual frames which are determined by the main deflection width of the charged beam;

(determining a size of a first subfield in the repetitive pattern block array so that the size of the firs subfield corresponds to that of each of the same-sized repetitive pattern blocks:)

determining a size of the second subfield in the non-repetitive pattern block array so that each of the second subfields has a size corresponding to maximum subdeflection width of the charged beam;

determining whether the reference position of each of said subfield regions is included in one of said virtual frames so that each subfield residing at a boundary of two adjacent frames is distributed to either of the two adjacent frames;

constituting pattern drawing subfield data by using a unit pattern data of said same-sized repetitive pattern blocks, a number of the repetitive pattern blocks included in the frame and arranged in the main deflection width and pitch data representing a pitch between adjacent same-sized repetitive pattern blocks;

processing pattern data of the subfield having the at least one pattern extending into an adjacent frame as data which is included in the range of the one of said virtual frames according to a result of the distribution determination process;

combining the constituted frame data for pattern drawing to form an IC pattern data;

positioning the charged beam at the reference position of each subfield by the main deflection device; and

drawing a desired at least one pattern on the predetermined substrate based on the formed pattern drawing subfield data by a subdeflection device in units of subfield regions.

4,989,157

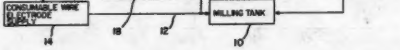
AUTOMATED CHEMICAL MILLING CONTROLLER

Todd A. Balisky, Tacoma, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 22, 1985, Ser. No. 693,693

Int. Cl.[5] G01N *27/00*; G06F *15/46*

U.S. Cl. 364—500 **12 Claims**



11. An automated system for monitoring and controlling the milling rate of a chemical milling solution during a milling operation, comprising:

(a) a supply of wire of known composition and cross-section;

(b) means for immersing a predetermined portion of the wire into the solution on the milling tank at predetermined, periodic intervals;

(c) means for creating a current within the wire upon immersion of the wire into the solution in the milling tank;

(d) a clock activated by a current in the wire above a predetermined threshold;

(e) means for deactivating the clock when the current falls below a second threshold, the threshold indicating milling of a predetermined portion of the wire;

(f) means for calculating the actual milling rate of the solution automatically in response to the elapsed time measured with the clock;

(g) means for normalizing the milling rate in response to the actual temperature of the solution in the milling tank; and

(h) means for adding a predetermined quantity of a feedstock from a reservoir into the solution in response to the normalized milling rate of step (g), the quantity maintaining the milling rate within a predetermined range.

4,989,158

VIBRATION CONTROL SYSTEM

Edwin A. Sloane, Los Altos, Calif., assignor to Schlumberger Technologies Limited, Farnborough, England

Continuation of Ser. No. 283,445, Dec. 15, 1988. This application May 24, 1990, Ser. No. 528,645

Int. Cl.[5] G01N *29/00*

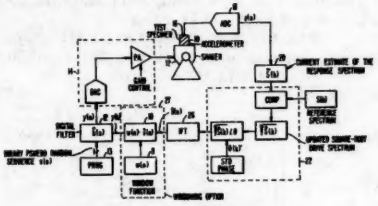
U.S. Cl. 364—508 **10 Claims**

1. A vibration control system that includes a vibrator mechanism for transferring vibrational energy characterized by a stored desired reference spectrum to a device under test (DUT), where the vibrator mechanism is energized by a drive

signal, and where the power spectrum of the drive signal is determined by the output of a filter acting on a random noise source, and where a transducer coupled to the DUT generates an actual response signal characterized by the actual vibration spectrum experienced by the DUT, said filter having a frequency response determined by comparing the actual vibration spectrum experienced by the DUT with the stored desired reference spectrum, said system comprising:

a random noise generator for providing a random noise signal;

a digital filter including a programmable impulse response generator that receives a drive spectrum impulse response signal, with said digital filter having an input coupled to said random noise generator, an output for providing the drive signal, and having an impulse response characterized by a drive spectrum representative of the frequency response required to modify said random noise signal to produce a drive signal that will cause the actual DUT vibration spectrum to approach the desired reference



spectrum, said digital filter for filtering said random noise signal to generate the drive signal;

a spectrum analyzer, coupled to said transducer to receive the actual response signal, for estimating the actual vibration response spectrum;

a comparator, having an input for receiving the stored desired reference spectrum and an input coupled to said spectrum analyzer to receive the estimated actual vibration response spectrum, to provide a required frequency response signal, with the required frequency response representing the difference between the actual and desired vibration spectrums;

a frequency domain to time domain transformer for converting said required frequency response signal to a time domain impulse response signal; and

a multiplier for multiplying said time domain impulse response by a preselected window function to provide a modified low leakage power spectrum impulse response signal coupled to the programmable impulse response generator of said digital filter.

4,989,159

MACHINE MONITORING METHOD

Ludwik Liszka, and Jan Liszka-Hackzell, both of Parkvägen 4-S-910 36, Sävar, Sweden

Filed Feb. 15, 1989, Ser. No. 311,490

Claims priority, application Sweden, Oct. 13, 1988, 8803658-7

Int. Cl.[5] G01M *7/00*

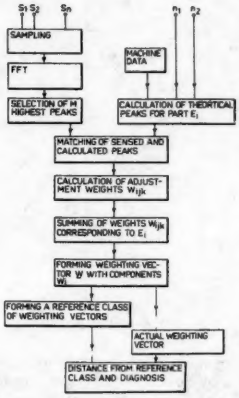
U.S. Cl. 364—508 **6 Claims**

1. A method of continuously monitoring the operational state of a machine, particularly a complicated machine with at least two rotating parts, working at different revolutionary rates and in mutual co-action, sensed vibration states being processed by analysis of frequency spectra while utilizing sampling and pattern recognition techniques, abnormal operational conditions being detected by calculating the probability of a sensed vibration state differing significantly from normal operational states, which are represented by a reference class calculated on the basis of previously sensed vibration states during normal operation of the machine, said method comprising the steps of:

(a) calculating expected peaks in a vibration spectrum theoretically for each vibration-generating machine part or partial system in the machine and the occurring revolutionary rates;

(b) selecting a plurality of peaks in the respective vibration spectrum during continuous sensing of the actual vibration states;

(c) matching at least one of said expected peaks to each selected actual peak, and assigning to each such match an adjustment weight, which increases with the amplitude of the actual peak and decreases with the frequency distance between the actual and its matched calculated peak;


SAMPLING
FFT
SELECTION OF M HIGHEST PEAKS
MACHINE DATA
CALCULATION OF THEORTICAL PEAKS FOR PART Ei
MATCHING OF SENSED AND CALCULATED PEAKS
CALCULATION OF ADJUSTMENT WEIGHTS Wijk
SUMMING OF WEIGHTS Wijk CORRESPONDING TO Ei
FORMING WEIGHTING VECTOR W WITH COMPONENTS Wi
FORMING A REFERENCE CLASS OF WEIGHTING VECTORS
ACTUAL WEIGHTING VECTOR
DISTANCE FROM REFERENCE CLASS AND DIAGNOSIS

(d) summing all adjusting weights associated with a given machine part or partial system to form a part weight;

(e) forming a weight vector corresponding to the machine in its entirety, the components of this vector comprising said part weights; and,

(f) forming said reference class on the basis of a plurality of weight vectors, each new weight vector being compared with said reference class, whereupon it is determined whether the difference exceeds a predetermined statistical spread value.

4,989,160

APPARATUS AND METHOD FOR CONTROLLING FUNCTIONS OF AUTOMATED GAS CABINETS

Charles W. Garrett, Somerville, Ala.; William H. Robinson, Jr., Huntland, Tenn., and Dennis A. Sierk, Huntsville, Ala., assignors to SCI Systems, Inc., Huntsville, Ala.

Filed May 17, 1988, Ser. No. 194,828

Int. Cl.[5] C23C *13/02;* **G06F** *15/20*

U.S. Cl. 364—509 **33 Claims**

1. A method for controlling functions of an automated gas cabinet adapted to supply process gas under pressure through a high pressure area being normally isolated from remaining points of said manifold, said method comprising a purge operation comprising the steps of:

initially storing data representing selected first and second time intervals in a control system; and

actuating said control system to automatically perform at least one automatic purge cycle including the steps of:

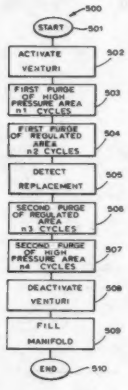
activating venturi means connected to a first point of said manifold outside of said high pressure area for creating a vacuum in all points of said manifold in fluid communication with said first point;

opening a vent valve for a period of time equal to said first selected time interval to place said high pressure area of said manifold in fluid communication with said venturi means; and

following closure of said vent valve, opening a purge valve

connected between a supply of purge gas and said high pressure area of said manifold for a period of time equal to said second selected time interval for filling said high pressure area with purge gas.

29. A method for facilitating the replacement of components in a semiconductor process gas supply system having a conduit for conducting process gas to a utilization station, said method comprising the steps of:



purging said conduit, prior to removing a component from said system, by flowing a purge gas through said conduit for a predetermined length of time;

selecting said length f time by utilizing adjustable input means for inputting to and storing in pre-programmed general purpose digital computer means signals representing said predetermined length of time, and

utilizing said computer means to automatically control said purging step in accordance with said stored signals.

4,989,161

CONTROL UNIT FOR A MULTI-DEGREE-OF FREEDOM MANIPULATOR

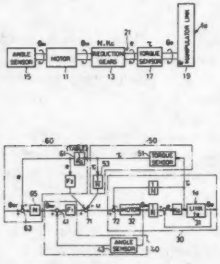
Junji Oaki, Komae, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 29, 1988, Ser. No. 161,760

Claims priority, application Japan, Feb. 27, 1987, 62-43182

Int. Cl.[5] B25J *9/16*; G06F *9/00*

U.S. Cl. 364—513 **9 Claims**



1. A control unit for a multi-degree-of-freedom manipulator and having a motor link system including a motor for producing an output torque at each joint shaft actuator and a motor rotational angle position control system, which further comprises:

a non-linear and interference force compensation control system having a torque sensor for detecting a torque (τ) exerting on each joint shaft and a first operator;

a flexure and vibration compensation control system having a second operator,

a first correction value being produced through said first operator which multiplies a torque signal (τ) produced from the torque sensor by a reciprocal of a reduction gear ratio (1/N),

a second correction value being produced through said second operator which multiplies the torque signal (τ) produced from the torque sensor by a reciprocal of a spring constant (1/KG) of each joint; and

operational means for adding the first and second correction values to input signals to the motor actuator.

4,989,162

METHOD OF USING AN ACCURACY VALVE IN A CONFLICT RESOLUTION OF A FORWARD INFERENCE

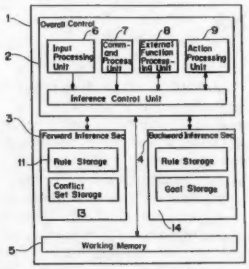
Toshiyuki Tanaka; Nobuo Nakamura, both of Yamatokoriyama, and Mutsuhiro Yamamoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 1, 1988, Ser. No. 278,441

Claims priority, application Japan, Dec. 3, 1987, 62-307999

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **2 Claims**



1. An interrogating device comprising:

input processing means for reading data and classfying the data into facts, forward inference rules having a condition section corresponding to each of said forward inference rules, backward inference rules, and commands;

a working memory for storing said facts;

backward inference control means for setting a goal in response to said backward inference rules and comparing said goal with said facts from said working memory to determine whether said goal has been established and storing said goal in said working memory as one of said facts when said goal has been determined to be established,

forward inference control means for comparing each of said facts from said working memory with each element of said condition section and synthesizing a conflict set, said conflict set including a plurality of executable rules and facts defined by the elements of said condition section which match said facts stored in said working memory;

inference control means for enabling said forward inference control means, enabling said backward inference control means or storing said facts in said working memory in response to said commands;

means for calculating accuracy values for each of said executable rules and said facts of said conflict set according to a predetermined equation; and

accuracy establishments means for adding said accuracy values to each of said executable rules and said facts of said conflict set, said accuracy values being used to evaluate the comparison between each element of said condition section and said facts by said forward inference control means for synthesizing one of said executable rules of

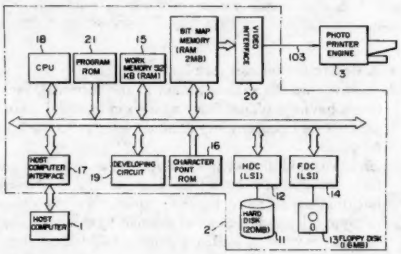
said conflict set according to a strategy which provides a conflict resolution of said conflict set by selecting said one executable rules of said conflict set.

4,989,163

PHOTO PRINTER HAVING A HOST COMPUTER ASSIST FUNCTION AND METHOD OF CONTROLLING THE SAME

Yoshio Kawamata; Syoichi Ito, both of Ibaraki, and Katsufumi Takagishi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 225,782
Claims priority, application Japan, Jul. 31, 1987, 62-192449
Int. Cl.[5] G03B *15/00*
U.S. Cl. 364—519 **13 Claims**



1. A method of controlling the operation of photo printer having an interface to be connected with a host computer, a nonvolatile data read/write memory, and a volatile data read/write memory, comprising:

a first step of, in response to a first command issued by said host computer indicating a print mode, converting print data sent from said host computer into dot pattern data, storing the dot pattern data in said volatile memory, and printing the dot pattern data on a sheet; and

a second step of, in response to a second command issued by said host computer indicating a non-print mode, operating said nonvolatile memory as an auxiliary memory for said host computer, and operating said volatile memory as a buffer memory for said nonvolatile memory, when said second command is a read or write command issued by said host computer.

4,989,164

PROCESS AND DEVICE FOR DETERMINING THE CAMBER OF A SHEET

Martine E. Desrousseaux, Peteghem, France, assignor to TFK, Brande Synthe, France

Filed May 27, 1988, Ser. No. 199,700
Claims priority, application France, May 29, 1987, 87 07590
Int. Cl.[5] G06F *15/46*; B21B *37/00*; H04N *7/18*
U.S. Cl. 364—551.01 **27 Claims**

1. Process for determining the camber of a sheet comprising:

taking a reading of the shape of the sheet,

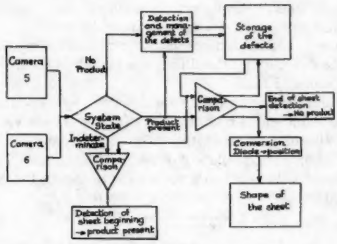
determining three portions of the sheet respectively corresponding to a head, a body and a foot of the sheet,

causing the sheet to travel on conveyor means between a source of light which extends throughout the width of conveyor means and a means for detecting portions of the source of light hidden by the sheet as it travels by, one of said source of light and said means for detecting being disposed above and the other being disposed below the conveyor means,

initiating the detecting means at a given frequency to obtain successive samplings of the sheet and reconstitute the shape of the sheet,

determining a variation in portions of the source of light hidden by the sheet between two predetermined samplings and comparing said variation with a given threshold for delimiting the body from the head and the foot of the sheet,

delimiting at each end of the body of the sheet a search region between a first point (A,B) corresponding to the end of the body (BT) of the sheet and a second point (A',B') located at a given distance (d) from the first point, and determining in said search region a pair of end points (D,F) of the usable region such that for any selected first point (M) located between the second point (A',B') and one end point (D,F) of the usable region of the sheet, a rise between a median fiber of the sheet and a chord drawn between the second point (A'B') and the selected first point (M) is less than a given threshold, and for any selected first point (M) located between the first point (A,B) and the respective end point (D,F) of the usable region of the sheet, a rise between the median fiber of the sheet and a chord drawn between the second point (A',B') and the selected second point (M) is larger than said given threshold, and,



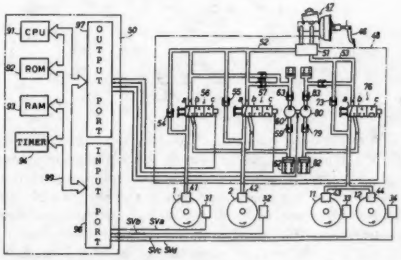
determining on the body of the sheet a usable region, and calculating in the usable region different values permitting a determination of different parameters characterizing the camber in order to arrive at a measurement of the camber of the sheet.

4,989,165

APPARATUS FOR CALCULATING VEHICLE-WHEEL REVOLUTION VALUES

Masao Watanabe, and Ken Asami, both of Nagoya, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Apr. 17, 1989, Ser. No. 339,252
Claims priority, application Japan, Apr. 19, 1988, 63-96319
Int. Cl.[5] B60T *8/32*; G06F *15/20*
U.S. Cl. 364—565 **13 Claims**



1. An apparatus for calculating vehicle-wheel revolution estimated values and performing vehicular control based thereon, the apparatus comprising:

at least one vehicle-wheel sensor for detecting a parameter from movement of vehicle wheels and producing an electric signal corresponding to said parameter; and

an electronic control unit operatively connected to said at least one vehicle wheel sensor, comprising:

means for calculating another parameter from the detected parameter; and

means for removing noise from one of the detected parameter and the calculated parameter to obtain said estimated value;

output means for outputting an electric signal corresponding to said estimated value; and

control means for receiving said electric signal from the output means and performing vehicular control based thereon,

said means for removing noise comprising:

difference detection means for detecting a difference between one of the detected parameter and the calculated parameter, and a previous estimated value;

difference accumulating means for accumulating the difference detected by the difference detection means at a predetermined rate;

various determining means for determining a variation value and reducing an increase rate of the variation value when an absolute value of the difference accumulated by the difference accumulating means increases; and

estimated-value updating means for updating the estimated value according to the variation value.

4,989,166

METHOD FOR SYNTHESIZING ANALYSIS MODEL AND FLOW ANALYSIS SYSTEM

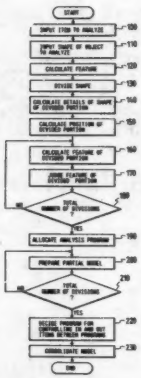
Shingo Akasaka, Zushi; Kazuhiro Sugino; Junichi Saeki, both of Yokohama; Kunihiko Nishi, Tokyo, and Hisashi Onari, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,480

Claims priority, application Japan, Jul. 12, 1988, 63-171778; Aug. 1, 1988, 63-190645

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—578 **12 Claims**



1. A method for synthesizing analysis models of an object by way of a numerical analysis system, the method comprising the steps of: registering in advance a corresponding relationship between respective analysis programs and each of a plurality of shapes and features of an object; when information identifying a shape of an object to be analyzed is input, shape-dividing the object into portions to be analyzed on the basis of a shape and feature obtained from said shape identifying information, and selecting the analysis programs which correspond to the shapes of the divided portions; and controlling input and output items between adjacent divided portions of the object on the basis of the positional relationship between the portions and input and output information of the analysis programs which correspond to the divided portions.

4,989,167

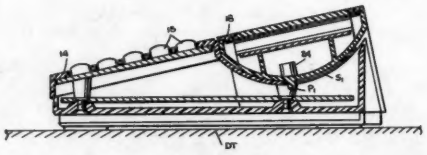
DESKTOP COMPUTER TERMINAL HAVING AN ANGULARLY ADJUSTABLE ELECTRONIC DISPLAY MODULE

Jeffrey Kapec, 248 Wilton Rd., Westport, Conn. 06880, and Kazuna Tanaka, 5 Frontier Rd., Cos Cob, Conn. 06807

Filed Sep. 11, 1989, Ser. No. 405,276

Int. Cl.[5] G06F *1/00*

U.S. Cl. 364—708 **9 Claims**



1. A desktop computer terminal comprising:

A. a keyboard for entering data in the terminal, said keyboard having a planar face and keys mounted thereon, said planar face being slightly inclined relative to the horizontal plane;

B. an electronic display module for presenting data entered into the terminal by an operator at the keyboard and information received by the terminal from a computer, said module having a casing defined by a semi-cylindrical trough covered by a planar panel on which an electronic display is mounted; and

C. a complementary cradle defined by a concavity for nesting the module at a position adjacent the keyboard, said module being shifted in the cradle in a predetermined angular range from a minimum zero angle position in which the module is fully nested in the cradle and the panel is then coplanar with the face of the keyboard to a maximum angular position in which the panel of the module is sharply inclined relative to the face of the keyboard and the module is then partially nested in the cradle, said module being adjusted to an angle at which the display is fully visible to the operator under prevailing light conditions.

4,989,168

MULTIPLYING UNIT IN A COMPUTER SYSTEM, CAPABLE OF POPULATION COUNTING

Koji Kuroda, and Shoji Nakatani, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 21, 1988, Ser. No. 273,582

Claims priority, application Japan, Nov. 30, 1987, 62-302463; Jan. 20, 1988, 63-010091

Int. Cl.[5] G06F *7/00, 7/52*

U.S. Cl. 364—715.09 **11 Claims**

1. A multiplying unit provided in a computer system, to perform multiplication of multiplicand data and multiplier data in a multiplication mode and to perform population counting of population counting input data in a population counting mode, said multiplying unit comprising:

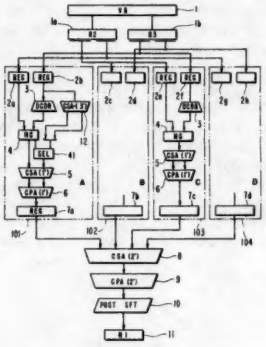
means for dividing the multiplicand data into a plurality of multiplicand elements having a first size in the multiplicand mode;

dividing means for dividing the multiplier data into a plurality of multiplier elements having a second size in the multiplication mode, and for dividing the population counting input data into a plurality of population counting elements of the second size in the population counting mode;

a plurality of multiplying sub-units for executing simultaneously partial multiplication among the multiplicand elements and the multiplier elements when in the multiplication mode to produce partial product data, and for executing simultaneously partial population countings for

the population counting elements when in the population counting mode to produce partial counted data; and

means for adding the partial product data from said multiplying sub-units and outputting a multiplication result of



the multiplicand data and the multiplier data when in the multiplication mode, and for adding the partial counted data from said multiplying sub-units and outputting a population counting result of the population counting input data when in the population counting mode.

4,989,169

DIGITAL TONE DETECTOR USING A RATIO OF TWO DEMODULATORS OF DIFFERING FREQUENCY

Shawn R. McCaslin, Cedar Creek; Tim A. Williams, and Nicholas R. van Bavel, both of Austin, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 5, 1990, Ser. No. 474,607

Int. Cl.[5] G06F *15/31*

U.S. Cl. 364—724.09 **8 Claims**

1. A tone detector circuit for receiving a modulated input signal which selectively contains a tone signal and providing an output signal which indicates a detection of the tone signal, said tone detector circuit comprising:

a first demodulator circuit having an input for receiving the modulated input signal and demodulating the input signal at a first predetermined frequency to provide a first control signal at an output terminal;

a second demodulator circuit having an input for also receiving the modulated input signal and demodulating the input signal at a second predetermined frequency which is different than the first predetermined frequency to provide a second control signal at an output terminal; and

a detector circuit coupled to the output terminals of the first and second demodulators for respectively receiving the first and second control signals and providing the output signal indicating detecting the tone signal in response to detecting a ratio of the first and second control signals falling within a predetermined range of values.

4,989,170

HYBRID STOCHASTIC GRADIENT FOR CONVERGENCE OF ADAPTIVE FILTER

Roy G. Batruni, Newark, and Howard A. Wilson, Santa Clara, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 204,615, Jun. 9, 1988, abandoned. This application Feb. 8, 1990, Ser. No. 478,719

Int. Cl.[5] G06F *15/31*

U.S. Cl. 364—724.19 **5 Claims**

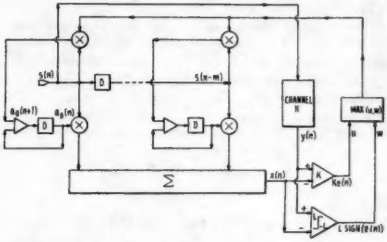
1. Stochastic control circuitry for adaptively tracking the output of a communication channel, the stochastic control circuitry comprising:

(a) an adaptive filter;

(b) means for driving both the adaptive filter and the communications channel utilizing a common input signal to produce an adaptive filter output signal and a communications channel output signal, respectively;

(c) first comparator means for comparing the adaptive filter output signal and the communications channel output signal in accordance with a first criteria to generate a first comparator output signal;

(d) second comparator means for comparing the adaptive



filter output signal and the communications channel output signal in accordance with a second criteria to produce a second comparator output signal; and

(e) third comparator means, which receives the first and second comparater output signals as inputs, for comparing the first comparator output signal and a preselected value and wherein the third comparator means provides the first comparator output signal as a third comparator output signal if the first comparator output signal is greater than or equal to the preselected value and provides the second comparator output signal as the third comparator output signal if the first comparator output signal is less than the preselected value.

4,989,171

DATA PROCESSING METHOD AND APPARATUS FOR CALCULATING A MULTIPLICATIVELY INVERTED ELEMENT OF A FINITE FIELD

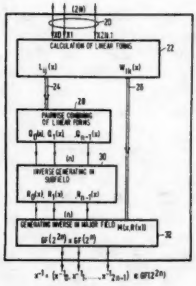
Hendrik D. L. Hollmann, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 12, 1989, Ser. No. 420,844

Claims priority, application European Pat. Off., Oct. 18, 1988, 88202324.5

Int. Cl.[5] G06F *7/00*

U.S. Cl. 364—746.1 **3 Claims**



1. A method for calculating a multiplicative inverse of an input element of a finite, major field that contains a subfield of index 2, the major field containing a quadratically larger num-

ber of elements than the subfield, the method comprising the steps of:

a. receiving the input element X as represented by a first set of vector components (X0, X1 . . . X2n−1), wherein n is the dimension of the major field;

b. from said first set generating a second set of binary linear forms Lij(X), wherein i=0 . . . n−1 and j=1 . . . 2n, and a third set of matrix organized linear forms wlk(X), wherein l=0 . . . 2n−1, k=0 . . . n−1, by means of selective EXCLUSIVE-ORing of said vector components;

c. pairwise combining elements of said second set by field-wise multiplication for generating a fourth set of quadratic forms and combining such quadratic forms by means of EXCLUSIVE-ORing for generating a fifth set of quadratic forms as representing corresponding further vector coefficients Q0(X) . . . Qn−1(X) in said subfield;

d. inverting in the subfield a subvector represented by said further vector coefficients to an inverted subvector; and

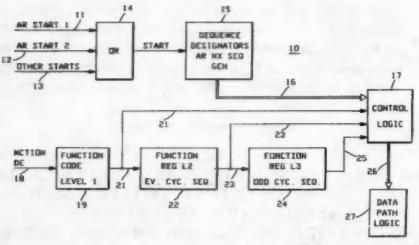
e. multiplying components of said inverted subvector by respective elements of said third set of matrix organized linear forms to, by means of addition of products acquired by said multiplying, generate components of said multiplicative inverse.

4,989,172

APPARATUS AND METHOD FOR CHECKING START SIGNALS

Peter B. Criswell, Bethel, Minn., assignor to Unisys Coporation, Blue Bell, Pa.

Filed Feb. 6, 1990, Ser. No. 475,610
Int. Cl.[5] G06F *11/00*
U.S. Cl. 364—737 **10 Claims**



1. Apparatus for detecting start error signals in an instruction processor, said apparatus comprising:

means for indicating the presence of start signals at a predetermined time after the initial presence of a valid start signal,

start error detecting means having a data input and an enable input coupled to said means for indicating the presence of start signals,

cycle indicating means coupled to the data input said start error detecting means for indicating a minor time cycle of operation of the instruction processor, and

first strobe timing means coupled to said start error detecting means for raising a start error signal when a start signal is being attempted during an improper minor time cycle of operation.

4,989,173

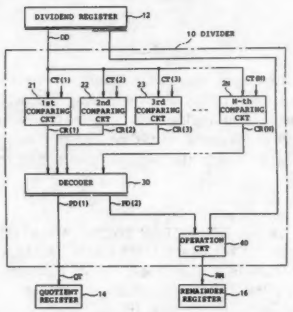
FAST DIVIDER FOR A CONSTANT DIVISOR

Masayuki Kaneda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 19, 1990, Ser. No. 466,148
Claims priority, application Japan, Jan. 19, 1989, 1-10786
Int. Cl.[5] G06F *7/52*
U.S. Cl. 364—764 **2 Claims**

1. A divider for dividing a dividend by a divisor to calculate a quotient and a remainder, said divisor being a natural number, each of said dividend, said quotient, and said remainder being an integer which is not less than zero, said dividend being L bits long, where L represents a first predetermined natural number which is not less than two, said divisor being a constant which is M bits long, where M represents a second predetermined natural number which is not less than two, comprising:

first through N-th comparing means supplied with said dividend in common and with first through N-th predetermined constants, respectively, for comparing said dividend with said first through said N-th predetermined constants, where N represents a third predetermined natural number which is not less than two, said third predetermined natural number N being related to said first and said second predetermined natural numbers L and M, respectively, by $N=2^{LM}-1$, an n-th predetermined constant being equal to n times said divisor, where n is variable between 1 and N, both inclusive, said first through said N-th comparing means producing first through N-th comparison result signals indicative of first through N-th comparison results, respectively;



decoding means connected to said first through said N-th comparing means for decoding a combination of said first through said N-th comparison result signals into a decoded signal which is divided into first and second partial decoded signals, said first partial decoded signal being equal to said quotient, said second partial decoded signal being equal to lower M bits of a product of said quotient and said divisor, the lower M bits of said product being arranged from a least significant bit 2^0 to an M-th bit 2^{M-1} as counted from said least significant bit 2^0; and

operation means supplied with said dividend and connected to said decoding means for carrying out an operation on said second partial decoded signal and lower M bits of said dividend that are arranged from a least significant bit 2^0 to an M-th bit 2^{M-1} as counted from said least significant bit 2^0, said operation means thereby producing said remainder.

4,989,174

FAST GATE AND ADDER FOR MICROPROCESSOR ALU

William F. Gardei, Downingtown, Pa., assignor to Commodore Business Machines, Inc., West Chester, Pa.

Filed Oct. 27, 1988, Ser. No. 263,570
Int. Cl.[5] G06F *7/50*
U.S. Cl. 364—786 **6 Claims**

1. A fast logic gate, comprising:

first, second and third inputs and an output,

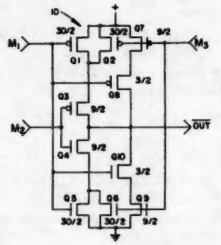
said first input (M1) being connected to the gate terminal of a p-channel field effect transistor (FET) (Q1) having a source terminal coupled to a supply voltage and to the gate of an n-channel FET (Q5) having a source terminal coupled to ground,

said second input (M2) being coupled to the gate terminals of

a p-channel FET (Q3) and an n-channel FET (Q4), the FETs Q3 and Q4 being connected together at their drain terminals with their source terminals connected respectively to the first-mentioned p-channel and n-channel FETs (Q1 and Q5),

said third input (M3) connected to the gate terminal of a p-channel FET (Q7) having a source terminal connected to the supply voltage, the third input also being connected to the gate terminal of an n-channel FET (Q9) which has a source terminal connected to ground,

said first input also being coupled to the gate terminals of a p-channel FET (Q8) and an n-channel FET (Q10) whose



drain terminal are coupled together and whose source terminals are respectively coupled to the drain terminals of the last-mentioned p-channel and n-channel FETs (Q7 and Q9),

said third input also being coupled to the gate terminal of a p-channel FET (Q2) which is shunt connected to said first-mentioned p-channel FET (Q1) and to the gate terminal of an n-channel FET (Q6) which is shunt connected to said first-mentioned n-channel FET (Q5), and

said output being coupled to the drain terminals of p-channel and n-channel FETs (Q3, Q4) and to the drain terminals of the p-channel and n-channel FETs (Q8, Q10).

4,989,175

HIGH SPEED ON-CHIP CLOCK PHASE GENERATING SYSTEM

Leonard D. Boris, King of Prussia, and David E. Chodelka, North Wales, both of Pa., assignors to Unisys Corp., Blue Bell, Pa.

Filed Nov. 25, 1988, Ser. No. 276,163
Int. Cl.[5] G06F *1/12*
U.S. Cl. 364—900 **19 Claims**

1. An on-chip phase generator for a computer having off-chip signals, comprising:

on-chip phase generator means having a plurality of output gates,

start-stop run control means coupled to said phase generator means and said off-chip control signals,

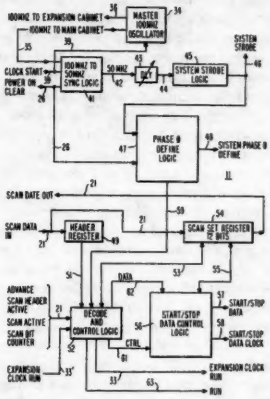
start register means,

stop register means,

said start and said stop register means each having a plural outputs being coupled to individual ones of said output gates of said phase generator means for starting and stopping at predetermined phases of said phase generator,

said start and stop register means having inputs coupled to said off-chip control signals for setting predetermined phase start and stop data therein, and

phase defining means coupled to said output gates of said phase generator means,



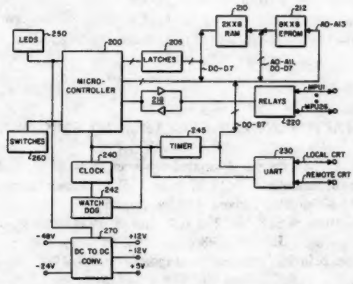
said phase defining means having inputs coupled to said off-chip control signals for generating phase defining timing signals.

4,989,176

REMOTE MAINTENANCE SYSTEM

Salim M. Khan, Phoenix, Ariz., assignor to AG Communication Systems Corporation, Phoenix, Ariz.

Continuation of Ser. No. 935,894, Nov. 28, 1986, abandoned. This application Dec. 6, 1988, Ser. No. 282,915
Int. Cl.[5] G06F *3/00*
U.S. Cl. 364—900 **18 Claims**



1. A terminal switching unit for a plurality of maintenance systems comprising:

intelligent terminal means including at least one local intelligent terminal means and at least one remote intelligent terminal means, said local and said remote intelligent terminal means each operated to transmit commands and to receive and display data;

said remote intelligent terminal means including, first modem means connected to said remote intelligent terminal means and to a transmission line, said first modem means arranged to transmit said commands from said remote intelligent terminal means to said transmission line and to receive said data from said transmission line and to transmit said data to said remote intelligent terminal means;

a plurality of switching and transmission systems and a plurality of maintenance processor unit means, each switching and transmission system including one corre-

sponding maintenance processor unit means, each maintenance processor unit means arranged to perform diagnostic testing of said corresponding switching and transmission system responsive to said commands, and to transmit said data gathered during the diagnostic testing of said corresponding switching and transmission system;

switching means including second modem means connected to said switching means and to said transmission line, said second modem means arranged to transmit said data from said switching means to said transmission line and to receive said commands from said transmission line, said switching means further connected to said local intelligent terminal means and each of said plurality of maintenance processor unit means, said switching means operable to analyze said commands transmitted by said local intelligent terminal means and to connect one of said plurality of maintenance processor unit means to said local intelligent terminal means for facilitating the transfer of said data from the connected maintenance processor unit means to said local intelligent terminal mans, and alternatively said switching means further operable to analyze said commands transmitted by said remote intelligent terminal means and to connect one other of said plurality of maintenance processor unit means to said remote intelligent terminal means for facilitating the transfer of said data from the connected maintenance processor unit means to said remote intelligent terminal means;

said switching means being further operated in response to said commands to transmit said commands from said local intelligent terminal means to the connected maintenance processor unit means and alternatively, to transmit said commands from said remote intelligent terminal means to the connected maintenance processor unit mans; and

and in response to said commands from said local intelligent terminal means the connected maintenance processor unit performs said diagnostic testing of said corresponding switching and transmission system, transmitting said data to said switching means and alternatively, in response to said commands form said intelligent terminal means the connected maintenance processor unit means performs said diagnostic testing of said corresponding switching and transmission system transmitting said data to said switching means.

4,989,177

ATTACHMENT CONNECTABLE TO ELECTRONIC TRANSLATOR

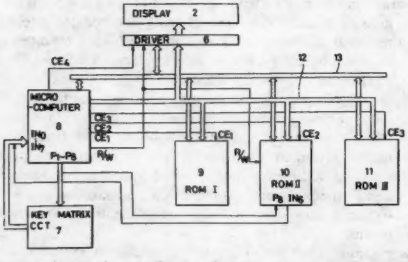
Masafumi Morimoto, Yamatokoriyama; Kunio Yoshida, and Tosaku Nakanishi, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 270,102, Jun. 3, 1981. This application Jan. 10, 1986, Ser. No. 817,796

Claims priority, application Japan, Jun. 10, 1980, 55-78559

Int. Cl.[5] G06F *15/38*

U.S. Cl. 364—900 **5 Claims**



1. An electronic translator wherein a first word or words represented in a first language are entered to obtain a second word or words represented in a second language equivalent in meaning to the first word or words, comprising:

input means for entering the first word or words;

memory means comprising a plurality of memory components for storing the second word or words;

access means for addressing said memory means for retrieving the second word or words;

display means for displaying retrieved second words;

at least one of said memory components being selectively removable from said electronic translator;

a connector for facilitating selective connection or removal of said at least one memory component; and

printing means for recording information retrieved from the electronic translator selectively removable from said electronic translator;

wherein said printing means is compatible with said connector whereby either said at least one memory component or said printing means is connected to said electronic translator via said connector.

4,989,178

PROGRAMMABLE CONTROLLER HAVING FORCIBLY SET OR RESET I/O STATES CONTROLLED BY STORED FLAGS IN A FLAG MEMORY

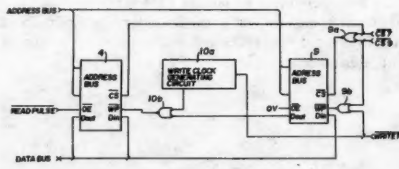
Hisashi Shonaka, Hirakata, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Oct. 9, 1986, Ser. No. 917,054

Claims priority, application Japan, Oct. 11, 1985, 60-226416

Int. Cl.[5] G06F *12/14, 12/16, 11/00*

U.S. Cl. 364—900 **3 Claims**



1. A programmable controller having an input/output simulation function for debugging user programs and comprising:

an input/output memory means for storing a plurality of input/output data items, said input/output memory means including means for writing input/output data items into said input/output memory means during an execution of a programmed command or during an updating of input data;

flag memory means for storing a plurality of flag data items, said flag memory means storing a number of flag data items which corresponds in number to a number of input-/output data items stored in said input/output memory means, each said flag data item corresponding to a respective input/output data item;

means for setting predetermined values of said input/output data items at selected addresses in said input/output memory means; and

control means for controlling said writing means to control the writing of input/output data items into said input/output memory means, said control means operating, during the execution of a programmed command or during the updating of input data, to inhibit the writing of input/output data items in said input/output memory means where a corresponding flag data item in said flag memory has been set,

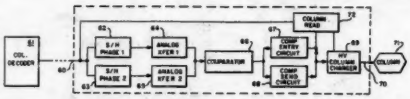
said setting means, when setting a selected input/output data item in said input/output memory means also setting in said flag memory means a flag value corresponding to the selected input/output data item.

4,989,179

HIGH DENSITY INTEGRATED CIRCUIT ANALOG SIGNAL RECORDING AND PLAYBACK SYSTEM

Richard T. Simko, Los Altos Hills, Calif., assignor to Information Storage Devices, Inc., Santa Clara, Calif.

Continuation of Ser. No. 218,634, Jul. 13, 1988, Pat. No. 4,890,259. This application Oct. 12, 1989, Ser. No. 420,296
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Int. Cl.[5] G11C *7/00, 11/40, 16/00, 27/00*
U.S. Cl. 365—45 12 Claims



1. Apparatus for storing analog information comprising:

a memory array comprising a plurality of rows and columns of floating gate non-volatile memory cells, for storing an analog signal;

write circuitry means coupled to said rows and columns and said memory array for selecting a plurality of cells and for storing a series of samples of a predetermined analog signal on their floating gates, said write circuitry including means for iteratively applying a series of write pulses simultaneously to all of said selected plurality of cells, said series of write pulses having a series of predetermined voltages starting from a low voltage and increasing in voltage with time, whereby charging resolution is improved;

read circuitry means coupled to said rows and columns of said memory array for detecting the analog signal level on each individual cell and for outputting said analog signal level; and

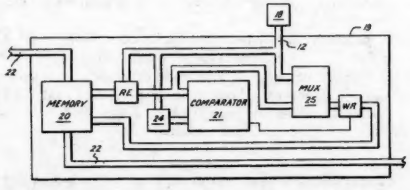
control means coupled to said read and write circuitry means operating to cycle reading and writing through the cells in said memory array.

4,989,180

DYNAMIC MEMORY WITH LOGIC-IN-REFRESH

G. Jack Lipovski, Austin, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Mar. 10, 1989, Ser. No. 321,847
Int. Cl.[5] G11C *11/406, 11/402, 15/00*
U.S. Cl. 365—189.07 5 Claims



1. A data storage and logical operation apparatus comprising:

dynamic data storage means, integrated on a single semiconductor material chip, for storing a plurality of words in adjacent word storage positions, said dynamic data storage means requiring refreshing in order to retain data;

means, integrated on said single semiconductor material chip, for periodically refreshing said dynamic data storage means in order to retain a state of data in said dynamic data storage means, including means for cyclically refreshing said words in said adjacent storage positions;

logic means, including a data comparator integrated on said single semiconductor material chip, connected to said means for cyclically refreshing, for comparing a predetermined comparand with each word stored in said adjacent word storage positions during refreshing, and for providing an indication of a match between said predetermined comparand and a target word; and

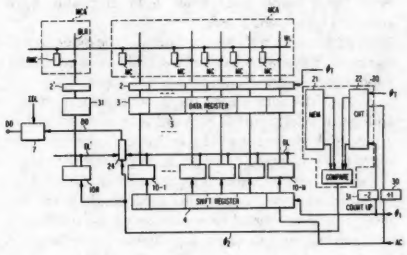
means for setting at least one mark bit of a word in a word storage position adjacent a storage position of said target word, responsive to said indication of a match.

4,989,181

SERIAL MEMORY DEVICE PROVIDED WITH HIGH-SPEED ADDRESS CONTROL CIRCUIT

Moemi Harada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,112
Claims priority, application Japan, May 30, 1988, 63-133453
Int. Cl.[5] G11C *8/00*
U.S. Cl. 365—200 5 Claims



1. A semiconductor memory device comprising a plurality of normal memory cells, at least one redundant memory cell, a serial selection circuit for serially selecting said normal memory cells in synchronism with a first control signal, a defective address memory circuit for storing locations of defective memory cells in said normal memory cells, a counter whose output corresponds to the address of the memory cell selected by said serial selection circuit, said counter being incremented in response to said first control signal, a comparison circuit for comparing the output of said counter with the output of said defective address memory circuit, said comparison circuit generating a second control signal when the output of said counter being coincident with the output of said defective address memory circuit, a redundant selection circuit responsive to said second control signal for selecting said redundant

memory cell in place of said normal memory cell, means for receiving an initial address corresponding to supplied external address, an address modification circuit receiving said initial address for generating an internal address which is larger than said initial addres by one, said counter being preset with said internal address, means for determining the state of said serial selection circuit relative to said initial address, and a count-up circuit for incrementing the state of said counter in response to said first control signal after a second occurrence of said first control signal after said internal address is generated.

4,989,182

DYNAMIC RANDOM ACCESS MEMORY HAVING DUMMY WORD LINE FOR FACILITATING RESET OF ROW ADDRESS LATCH

Hirohiko Mochizuki; Tsuyoshi Ohira, both of Kawasaki; Yukinori Kodama, Yokohama; Meiko Kobayashi, Tokyo, and Takaaki Furuyama, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 6, 1988, Ser. No. 254,153

Claims priority, application Japan, Oct. 6, 1987, 62-251983

Int. Cl.[5] G11C *7/00, 8/00*

U.S. Cl. 365—210 **9 Claims**

8. A dynamic random access memory comprising:

a memory cell array having a plurality of memory cells coupled to word lines and bit lines;

row address latch means for latching an external address signal when a latch enable signal is switched to a first level and for generating a first internal address signal, an address latch being reset when a latch enable signal is switched to a second level;

column address latch means for latching the external address signal after the latch by the row address latch means and generating a second internal address signal;

row address decoder means for decoding the first internal address to select one of the word lines and for controlling a potential of the selected word line so that the selected word line is charged up to a predetermined high level and thereafter is discharged to a predetermined low level;

column address decoder means for decoding the second internal address signal to select one of the bit lines;

dummy circuit means comprising a dummy word line having an electrical characteristic corresponding to that of the word lines and means for charging the dummy word line to the predetermined high level when the row address decoder means decodes the first internal address and for discharging the dummy word line to the predetermined low level when the selected word line is discharged to the predetermined low level; and

timing means for generating the latch enable signal which is switched to the second level when the potential of the dummy word line is decreased to the predetermined low level due to the discharge operation for the dummy word line, so that the address latched by the row address latch means is reset, said timing means comprising:

delay means for delaying a row address strobe signal supplied from an external circuit by a predetermined time;

an inverter for inverting the potential of the dummy word line, and

a NAND circuit performing a NAND operation between an output signal of the inverter and a delayed row address strobe signal supplied from said delay means.

4,989,183

SEMICONDUCTOR MEMORY DEVICE IMPROVED FOR EXTERNALLY DESIGNATING OPERATION MODE

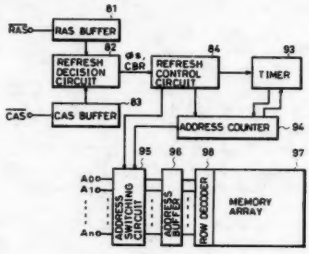
Masaki Kumanoya; Katsumi Dosaka; Yasuhiro Konishi; Takahiro Komatsu, and Youichi Tobita, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,558

Claims priority, application Japan, Aug. 31, 1988, 63-218709

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—222 **5 Claims**



3. A dynamic random access memory device operating in a $\overline{CAS}$ before $\overline{RAS}$ refresh mode and a self refresh mode comprising:

means for receiving a control signal to externally control said memory device,

said control signal having at least one cycle period;

operating means for operating said memory device in response to said control signal; and

cycle time comparing means for comparing a time period of one cycle of said control signal with a predetermined time period of a memory cycle,

said operating means operating said memory device in either said $\overline{CAS}$ before $\overline{RAS}$ refresh mode or said self refresh mode in response to the result of the comparison by said cycle time comparing means,

wherein said control signal comprises a row address strobe signal and a column address strobe signal; and

said means for receiving said control signal comprises a buffer means for receiving said row address strobe signal and column address strobe signal,

wherein said cycle time comparing means comprises $\overline{CAS}$ before $\overline{RAS}$ determining means connected to said buffer means for determining said $\overline{CAS}$ before $\overline{RAS}$ refresh mode by detecting the fact that the logic of said column address strobe signal changes before said row address strobe signal,

said predetermined memory cycle comprising said $\overline{CAS}$ before $\overline{RAD}$ refresh operation cycle; and

means for comparing a time period of one cycle of said row address strobe signal with a time period of said $\overline{CAS}$ before $\overline{RAS}$ refresh operation cycle.

4,989,184

SEMICONDUCTOR MEMORY DEVICE HAVING CURRENT TYPE SENSE AMPLIFIER IMPROVED FOR HIGH SPEED OPERATION AND OPERATING METHOD THEREFOR

Satoru Kishida, and Hisashi Matsumoto, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1989, Ser. No. 406,672

Claims priority, application Japan, Dec. 6, 1988, 63-309241

Int. Cl.[5] G11C *11/34*

U.S. Cl. 365—208 **12 Claims**

1. A semiconductor memory device comprising receiving means for receiving address signals,

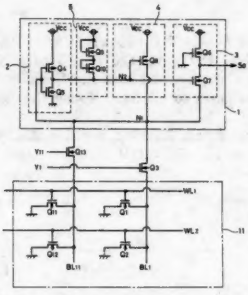
bit lines,

a plurality of memory cells each connected between said bit lines and a predetermined first potential and responsive to said address signals received by said receiving means to supply data signals stored therein to said bit lines,

a sense amplifier for amplifying a voltage applied to said but lines, and

first switching means connected between said bit lines and said sense amplifier for operating and operable in response to said address signals,

said sense amplifier having its input connected via said first switching means to said bit lines at a first node,



1: SENSE AMPLIFIER 11: MEMORY ARRAY

wherein said sense amplifier includes first inverter means connected to said first node and responsive to a voltage at said first node to output an inverted voltage with a delay,

second switching means connected between a predetermined second potential and said first node and operable in response to the inverted voltage output by said first inverter means,

potential holding means for holding the output of said first inverter means at a predetermined third potential, and

amplification means responsive to the output potential of said first inverter means to output amplified signals.

4,989,185

SEMICONDUCTOR DEVICE WITH CHANGE-OVER CIRCUIT TO ACCESS A MEMORY AREA BASED UPON INTERNAL OR EXTERNAL SIGNAL

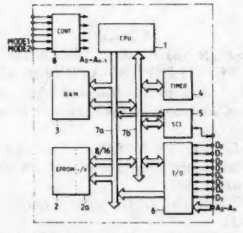
Akinori Matsuo, Higashiyamato; Masashi Watanabe, Kokubunji; Michio Fujimoto, Akishima; Masashi Wada, and Yoshihari Nagayama, both of Fuchuu; Kazuo Naito, Fuchuu, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corp., both of Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,736

Claims priority, application Japan, Jul. 15, 1987, 62-174703; Aug. 24, 1987, 62-208145

Int. Cl.[5] G11C *8/00, 11/408, 16/06*

U.S. Cl. 365—230.02 **7 Claims**



5. A semiconductor integrated circuit device comprising:

a memory including a plurality of memory cells, a plurality of word lines and a plurality of data lines, the plurality of word lines and he plurality of data lines being coupled to the plurality of memory cells so that each memory cell is coupled to one word line and one data line, the memory further including a word line selecting circuit coupled to the plurality of word lines for selecting one of the plurality of word lines, a first data line selecting circuit for selecting first ones of the plurality of data lines, and a second data line selecting circuit for selecting second ones of the plurality of data lines, wherein a number of the first ones of the plurality of data lines is larger than that of the second ones of the plurality of data lines;

a central processing unit for accessing the memory in a predetermined operation mode;

an input circuit coupled to the second ones of the plurality of data lines and responsive to first data supplied from outside of the semiconductor integrated circuit device for writing data corresponding to the first data into the memory cells electrically coupled to both the selected word line and the second ones of the plurality of data lines when the memory is accessed by an associated external device; and

an output circuit coupled to the first ones of the plurality of data lines and responsive to stored data in the memory cells electrically coupled to both the selected word line and the first ones of the plurality of the data lines for providing second data corresponding to the stored data to the central processing unit when the memory is accessed by the central processing unit.

4,989,186

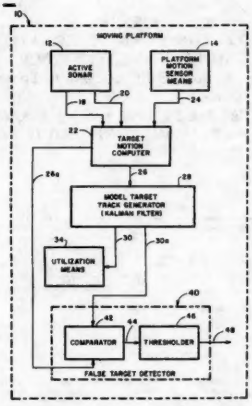
TARGET TRACKING SONAR WITH FALSE TARGET DETECTOR

Dennis W. Ricker, Centre Hall, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 16, 1982, Ser. No. 414,125

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—97 **6 Claims**



1. A sonar system carried by a moving platform, and operative to track a sonar target, said system comprising:

active sonar means for obtaining target relative position data;

means for providing platform motion data;

means responsive to said relative position data and said platform motion data to provide target actual acceleration data;

Kalman filter means for generating a math model target track characterized by estimated acceleration data; and

false target detection means for generating a predetermined output condition whenever said actual acceleration data

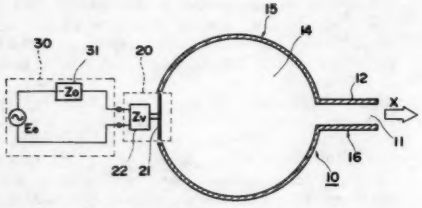
differs from said estimated acceleration data by acceleration error that is more than a predetermined threshold error value.

4,989,187

ACOUSTIC APPARATUS

Kenji Yokoyama, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Continuation of Ser. No. 287,381, Dec. 19, 1988, abandoned.
This application Apr. 26, 1990, Ser. No. 516,059
Claims priority, application Japan, Dec. 28, 1987, 62-334263
Int. Cl.[5] H04R *3/00*
U.S. Cl. 367—140 **18 Claims**



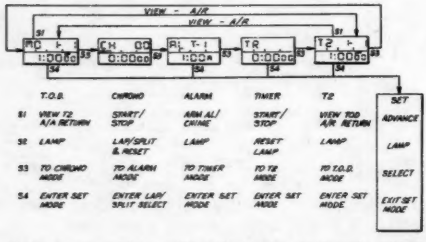
1. An acoustic apparatus comprising:
a resonator having a resonance radiation unit for radiating an acoustic wave by resonance;
a vibrator having a diaphragm constituting a part of said resonator and disposed in said resonator; and
a vibrator drive means for driving said vibrator so as to drive the resonator and to substantially cancel counterreaction of the resonator upon the vibration action of the diaphragm caused in response to driving of said resonator, wherein the resonator has a resonance frequency and resonance Q value set at desired values independent of the influence of the vibrator.

4,989,188

PROGRAM TO DISPLAY AN ALTERNATE MODE IN A MULTIMODE TIMEPIECE

Tom Thinesen, San Jose, Calif., assignor to Timex Corporation, Middlebury, Conn.

Filed Jan. 16, 1990, Ser. No. 465,868
Int. Cl.[5] G04C *17/00*; G04B *19/04*
U.S. Cl. 368—70 **9 Claims**



1. Improvement in a multimode electronic timepiece having a display, a plurality of manually actuated switches, and an integrated circuit programmed to keep time and to provide at least three modes including time-of-day mode, said integrated circuit being programmed to permit an operator to sequentially cycle to timepiece from a current mode of operation to the next mode of operation by selectively and repetitively actuating a first of said switches, wherein said improvement comprises:

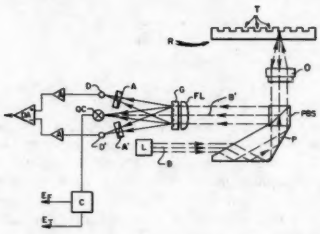
mode selection means including a program for said integrated circuit responsive to selective actuation by said operator of a second of said switches and adapted to temporarily display the status of an operating mode other than the current mode; whereby said operator can avoid cycling said timepiece through intervening modes (1) in order to temporarily display an other than current mode, and/or (2) in order to return said timepiece from other than current mode to current mode; said program being further adapted to automatically again display the current mode when said second selected switch is no longer actuated.

4,989,189

MAGNETO-OPTIC PLAYBACK APPARATUS INCLUDING ASTIGMATIC DIFFRACTING MEANS

Ingolf Sander, Cuputino, and Alan B. Marchant, San Jose, both of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 22, 1988, Ser. No. 234,767
Int. Cl.[5] G11B *13/04, 7/135*
U.S. Cl. 369—13 **9 Claims**



1. Apparatus for playing back information recorded on a magneto-optic recording element, said apparatus comprising:
(a) means for providing a beam of plane polarized radiation;
(b) means for scanning said beam relative to a magneto-optic recording element having information recorded thereon, said recorded information being adapted to product changes in the plane of polarization of said scanning beam;
(c) astigmatizing means positioned in the path of said beam as modified by said information for producing an astigmatized beam;
(d) a diffraction grating for diffracting the astigmatized beam to produce a zeroth order beam having a certain amplitude and a pair of diffracted beams of substantially equal amplitude;
(e) first detector means positioned in the path of said zeroth order beam for detecting the focus condition or tracking position of said beam on the recording element; and
(f) second and third detector means positioned respectively in the path of each of said diffracted beams for differentially detecting said changes in the plane of polarization for information signal retrieval.

4,989,190

APPARATUS FOR SEEKING A TRACK OF AN OPTICAL DISK IN WHICH INFORMATION IS RECORDED

Shigeru Kuroe; Takayuki Takeda, and Masayasu Sato, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,411
Claims priority, application Japan, Jul. 20, 1987, 62-180394; Jul. 20, 1987, 62-180395
Int. Cl.[5] G11B *7/085, 21/10*
U.S. Cl. 369—32 **17 Claims**

1. A track-seeking apparatus for use with an optical disk in which information is recorded in spiral or concentric circular tracks having data fields with pregrooves and identifier fields with pits, comprising:

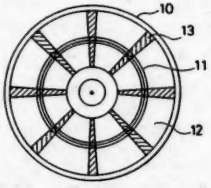
means for rotating said optical disk;

a pick-up unit for focusing a light beam onto said optical disk, detecting the light reflected from said optical disk, and converting it to at least one pick-up signal;

driver means for moving said pick-up unit parallel to said optical disk and across said tracks; and

a control circuit for receiving at least one pick-up signal and at least one of control signals, one of said control signals being a seek count signal indicating the number of tracks the light beam must cross to reach a target track, and controlling said driver means according to said at least one pick-up signal and said at least one of control signals so that said driver means causes said pick-up unit to move from a current track to the target track, wherein said control circuit comprises:

track-crossing detection means for detecting track crossings by said light beam and generating a track-crossing signal;



velocity detection means for detecting the pick-up velocity at which said pick-up unit is moving and generating a pick-up velocity signal;

simulation means for generating a simulated track-crossing signal according to said pick-up velocity;

identifier gating means for detecting when said light beam is focused on one of said identifier fields;

a switch controlled by said identifier gating means, for producing a track detect signal that consists of said track crossing signal when said light beam is not focused on one of said identifier fields, and said simulated track-crossing signal when said light beam is focused on one of said identifier fields; and

means for terminating the seek operation when, as a result of counting the track detect signal, said terminating means determines that said number of tracks indicated by said seek count signal has been crossed.

4,989,191

DATA PROCESSING SYSTEM WITH MIXED MEDIA MEMORY PACKS

Sheafen F. Kuo, Staten Island, N.Y., assignor to Frank Sheafen Kuo, Staten Island, N.Y.

Filed Jan. 3, 1989, Ser. No. 292,922

Int. Cl.[5] G11B *17/22*

U.S. Cl. 369—33 **14 Claims**

1. A data storage memory comprising:

at least one data storage pack including:

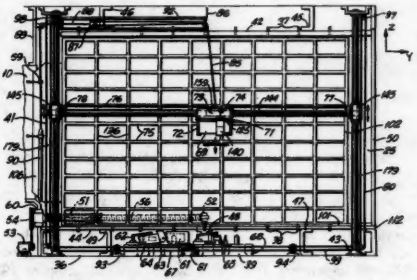
(a) a first data storage media containing a plurality of data storage units arranged in a predetermined matrix, said data storage units adapted to provide data in a format having relatively high capacity, and

(b) a second data storage media electrically independent of said first data storage media and mechanically attached to said first data storage media, said second data storage media adapted to provide digital data in a format permitting relatively high accessing speed,

processing means coupled to said second data storage media, said processing means including means to merge, sort and search said data of said second data storage media, said second media providing storage space for the main memory of said processing means;

a plurality of bins in each of said data storage packs, each of said data storage units being housed in a respective one of said bins,

each of said bins including a latching means, said latching means having a secure state which secures the respective one of said data storage units in said bin and an open state which permits a data storage unit to be moved out of said bin,



each of said bins having a spring associated therewith for biasing the associated one of said data storage units against said latching means,

said spring pushing said storage unit at least partly out of said bin when said latching means is in said open state.

4,989,192

OPTICAL PICKUP APPARATUS AND OPTICAL GRATING ASSEMBLY THEREFOR

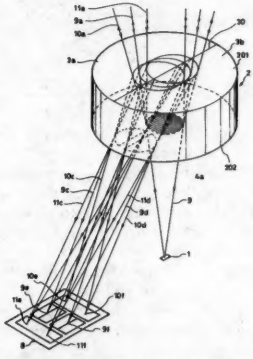
Yukio Kurata, Tenri; Hiroshi Ogata, Higashihiroshima; Hikaru Nishihara, Higashihiroshima; Mitsuharu Tomura, Higashihiroshima, and Shigeki Tsuji, Higashihiroshima, all of Japan, assignors to Sharp Kabushiki Kaisha, Oska, Japan

Filed Aug. 24, 1988, Ser. No. 235,901

Claims priority, application Japan, Aug. 24, 1987, 62-209934; Aug. 26, 1987, 62-212603; Aug. 26, 1987, 62-212604; Aug. 26, 1987, 62-212605; Aug. 26, 1987, 62-212606

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.12 **33 Claims**



17. An optical grating assembly to be disposed between a light source and an information carrying disc for orienting a portion of the light reflected by the disc to a photodetector comprising:

a first surface portion facing said light source;

a second surface portion acing said information carrying disc;

first grating means provided on said first surface portion for

diffracting a light beam from said light source into a zero-order beam and a pair of first order beams; and

second grating means provided on said second surface portion for orienting the portion of the light reflected by said disc to said photodetector.

4,989,193

OPTICAL ARRANGEMENT AND A READING APPARATUS

Claude Tinet, Paris, France, assignor to Thomson-CSF, Paris, France

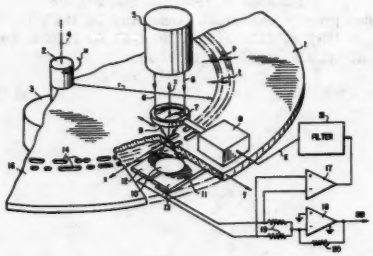
Continuation of Ser. No. 350,773, May 12, 1989, which is a continuation of Ser. No. 213,097, Jun. 29, 1988, Pat. No. 4,856,108, which is a division of Ser. No. 96,317, Sep. 9, 1987, Pat. No. 4,868,808, which is a continuation of Ser. No. 925,491, Oct. 29, 1986, abandoned, which is a continuation of Ser. No. 667,100, Nov. 1, 1984, abandoned, which is a division of Ser. No. 545,110, Oct. 25, 1983, Pat. No. 4,491,940, which is a continuation of Ser. No. 108,499, Dec. 31, 1979, abandoned, which is a continuation of Ser. No. 793,270, May 3, 1977, abandoned, which is a continuation of Ser. No. 390,715, Aug. 23, 1973, abandoned. This application Feb. 13, 1990, Ser. No. 479,252

Claims priority, application France, Aug. 25, 1972, 72 30346

The portion of the term of this patent subsequent to Jan. 1, 2002, has been disclaimed.

Int. Cl.[5] G11B *7/09*

U.S. Cl. 369—44.26 **4 Claims**



1. An apparatus for reading an optically readable carrier with diffractive tracks, comprising:

illumination means for projecting a concentrated light spot onto said carrier and said tracks, said light spot substantially occupying the width of a track in order to obtain diffraction of light along the track; the light emerging from said diffractive track having a spatial distribution representing an amount of track misregistration between said spot and the axis of said track,

photoelectric detection means arranged for collecting the radiant energy emerging from the portion of said track illuminated by said spot, and detecting an amount and direction of track axis misregistration from said spatial distribution,

wherein said photoelectric detection means comprises at least one photodetector assembly for sensing the spatial distribution of said radiant energy; and

positional control means for causing said spot to displace with respect to the illuminated track to compensate for any misregistration of the spot and track.

4,989,194

OPTICAL INFORMATION PROCESSING METHOD OF DRIVING AUTO-FOCUSING AND/OR AUTO-TRACKING MEANS IN ACCORDANCE WITH A STORED SERVO SIGNAL WHEN IRRADIATION OF A RECORD MEDIUM WITH LIGHT BEAM IS STOPPED, AND APPARATUS THEREFOR

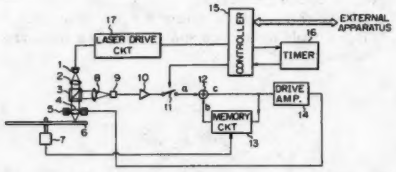
Shigeru Aoi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1989, Ser. No. 412,589

Claims priority, application Japan, Dec. 3, 1986, 61-286781

Int. Cl.[5] G11B *7/09*

U.S. Cl. 369—44.27 **14 Claims**



1. An optical information processing method, comprising the steps of:

recording or reproducing information while irradiating a periodically relatively moving recording medium with a light beam;

detecting focusing or tracking servo signals from the light beam irradiating the recording medium;

driving auto-focusing or auto tracking means in accordance with the detected servo signals;

storing at least one of the detected servo signals of at least one period of relative movement of the medium when the medium is irradiated with the light beam;

stopping the irradiation of the medium with the light beam;

driving one of the auto-focusing and auto-tracking means in accordance with the at least one stored servo signal when the irradiation of the medium with the light beam has stopped; and

re-starting the irradiation of the medium with the light beam for detecting the focusing or tracking servo signals and driving auto-focusing or auto-tracking means in accordance with the detected servo signals.

4,989,195

DISK RECORDING/REPRODUCING SYSTEM USING DISK IDENTIFICATION SIGNAL TO RETRIEVE STORED CONTROL PARAMETERS

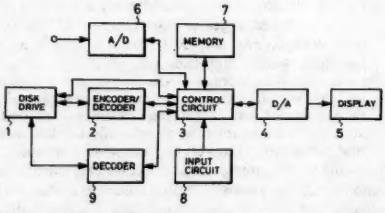
Tsutomu Suzuki, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,157

Claims priority, application Japan, Jul. 8, 1987, 62-171550

Int. Cl.[5] G11B *15/52, 27/22*

U.S. Cl. 369—50 **10 Claims**



1. A recording/reproducing system for a plurality of different types of disks, each of the disks having recorded thereon one of a plurality of identification signals which uniquely

identifies one of the plurality of different types of disks, the system comprising:

drive means for driving a disk so as to read the recorded identification signal, said drive means including means for supplying the read identification signal;

a control circuit, connected to said drive means, for receiving the identification signal;

memory means, connected to said control circuit, for storing a plurality of operating conditions for said drive means, said plurality of operating conditions being stored in said memory means such that each of the different types of disks has a corresponding set of operating conditions, and each of said set of operating conditions being addressed in said memory means by a different one of the identification signals,

said control circuit being operable, in response to receiving the identification signal, for reading from said memory means, that set of operating conditions corresponding to the identified type of disk, and for controlling said drive means according to the read set of operating conditions; and

input means for supplying instructions to said control circuit, each of the instructions representing a different mode of operation of said drive means, said control circuit operable for controlling the system according to the mode of operation instruction supplied by said input means after controlling said drive means according to said read set of operating conditions.

4,989,196

OPTICAL INFORMATION RECORDING APPARATUS

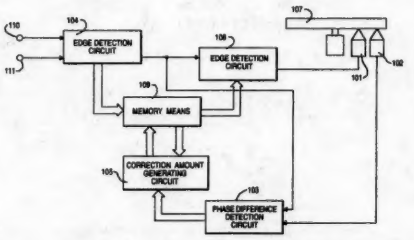
Akihiro Ishikawa, Neyagawa, and Haruo Isaka, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 29, 1988, Ser. No. 277,194

Claims priority, application Japan, Dec. 1, 1987, 62-305045; Feb. 9, 1988, 63-27959

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—54 **4 Claims**



1. An optical information recording apparatus comprising:

edge detection means operatively coupled to an input terminal of the apparatus for detecting a leading or a trailing edge of an input digital signal so as to output first digital signals;

edge correction means operatively coupled to said input terminal for correcting an edge of an input digital signal;

a recording head operatively coupled to said edge correction means for recording, on a recording medium by irradiating an optical beam, information corresponding to a corrected digital signal outputted from said edge correction means;

a reproducing head for reproducing, from said recording medium by irradiating an optical beam, a second digital signal corresponding to said informations having been recorded on said recording medium;

phase difference detection means operatively coupled to said reproducing head and said input terminal for detecting a phase difference between an edge of an input digital signal and a corresponding edge of said second digital signal;

memory means operatively coupled to said edge detection circuit for memorizing correction amounts at addresses thereof designated by said first digital signal; and

correction amount generating means operatively coupled to said phase difference detection means and said memory means for generating correction amounts based on signals detected by said phase difference detection means and the correction amounts preliminarily memorized in said memory means, wherein the correction amounts generated by said correction amount generating means are refreshly memorized in said memory means in place of said correction amounts preliminarily memorized in said memory means, and are also fed to said edge correction means,

whereby said edge correction means achieves the edge correction operation in accordance with the correction amounts generated by said correction amount generating means and fed thereto.

4,989,197

APPARATUS FOR PLAYING CARTRIDGE-STORED DISC

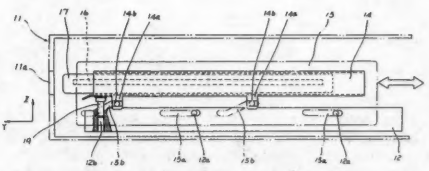
Akira Bessho, and Youichi Konno, both of Tokorozawa, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,724

Claims priority, application Japan, Aug. 6, 1987, 62-120646

Int. Cl.[5] G11B *33/02*

U.S. Cl. 369—77.2 **4 Claims**



1. An apparatus for playing a disc rotatably stored in a cartridge, comprising:

a housing having a slot for passing the cartridge therethrough;

playback means disposed in said housing for playing the disc, said playback means including a turntable having a disc support surface; and

a transfer mechanism for transferring the cartridge inserted through said slot onto said disc support surface of said turntable, said transfer mechanism comprising:

a stationary support member supporting thereon said playback means;

a holding member for holding the cartridge above said support member; and

a carrier mechanism for carrying said holding member movably with respect to said stationary support member between an elevated position and a lowered position,

said carrier mechanism including guide means for guiding said holding member movably with respect to said support member in a first direction perpendicular to said disc support surface, and positioning means for positioning said holding member selectively in the elevated position and the lowered position,

said guide means having at least one pair of guide pins extending vertically and downwardly in said first direction perpendicular to said disc support surface from said holding member, and at least one pair of guide holes defined in said stationary support member for receiving said guide pins respectively therein, said at least one pair of guide pins being retained in said at least one pair of guide holes during movement between the elevated position and the lowered position and said at least one pair of guide pins residing within said at least one pair of guide holes in both the elevated position and the low-

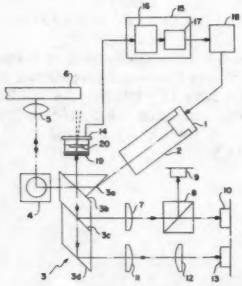
ered position for a stabilized positioning of said holding member at and between the elevated position and the lowered position.

4,989,198

BEAM CONTROL DEVICE UTILIZING BEAM HAVING A SPECIFIC DIRECTION OF POLARIZATION TO CONTROL A LASER USED IN AN OPTICAL MEMORY SYSTEM

Kunio Kojima, Nara; Daiji Yamane, Yamatokoriyama, and Noriaki Sakamoto, Souraku, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 27, 1988, Ser. No. 186,946
Claims priority, application Japan, Apr. 28, 1987, 62-107105
Int. Cl.[5] G11B *7/00*
U.S. Cl. 369—116 **5 Claims**



1. An optical memory system comprising:
laser means for producing a laser beam to read from, record onto and/or erase information from an optical disk;
driving means for driving said laser means at various power levels;
selection means for selecting only a laser beam having a specific direction of polarization from said laser beam outputted from said laser means;
detection means for detecting light intensity of said laser beam having said specific direction of polarization passing through said selecting means and for converting said light intensity into an electric signal; and
control means, responsive to said electrical signal, for varying a driving current utilized by said driving means to drive said laser means;
said selection means receiving part of said laser beam from a front side of a resonator of said laser means prior to said laser beam being applied to said optical disk.

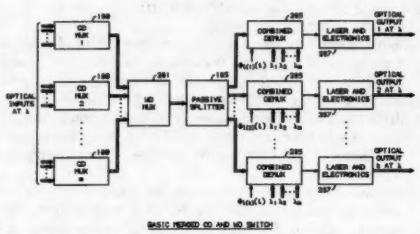
4,989,199

PHOTONIC SWITCH ARCHITECTURE UTILIZING CODE AND WAVELENGTH MULTIPLEXING

Theodore S. Rzeszewski, Lombard, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 31, 1988, Ser. No. 265,118
Int. Cl.[5] H04J *14/00*
U.S. Cl. 370—1 **17 Claims**

1. A two-stage multiplexer for multiplexing a plurality of input signals to generate an output signal comprising:
a plurality of first means, each means responsive to a plurality of said input signals for generating an intermediate signal comprising a plurality of code division multiplexed signals; and
second means for combining the intermediate signals to generate the output signal, comprising a plurality of wavelengths, each wavelength for carrying the intermediate signal of one of the first means;
wherein the input signals comprise modulated optical input signals, and wherein each of the first means comprises:
a plurality of means for phase shifting an optical signal, each means responsive to a modulated optical input signal and to one of a plurality of orthogonal code sequences for generating a modulated lightwave output signal, and



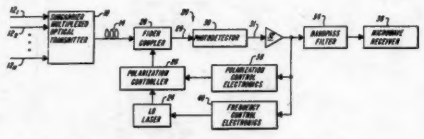
third means comprising optical amplification means for combining the modulated lightwave output signals of the plurality of phase shifters for generating the intermediate signal.

4,989,200

COHERENT SUBCARRIER MULTIPLEXED OPTICAL COMMUNICATION SYSTEM

Robert Olshansky, Wayland, and Richard W. Gross, Arlington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 22, 1988, Ser. No. 289,009
Int. Cl.[5] H04J *14/02*
U.S. Cl. 370—3 **21 Claims**



1. An optical communication system comprising:
transmitter means including a transmitter laser for generating an optical carrier and means for modulating the optical carrier with a composite modulation signal comprising a plurality of modulated microwave subcarriers to provide an optical signal, for optical signal comprising a single optical carrier that is modulated with a plurality of modulated microwave subcarriers; and
receiver means remotely located from said transmitter means and means for coupling said optical signal from said transmitter means to said receiver means, said receiver means including
local oscillator means for generating a local light beam,
detector means responsive to the received optical signal and said local light beam for providing a detected signal at an intermediate frequency which carries said plurality of modulated microwave subcarriers, and
microwave receiver means responsive to the detected signal from said detector means for demodulating at least one of said plurality of modulated microwave subcarriers.

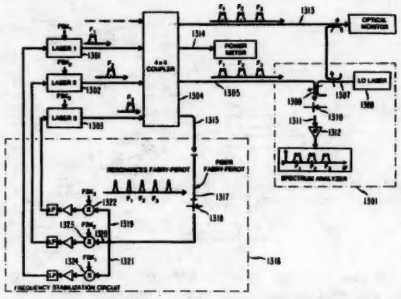
4,989,201
OPTICAL COMMUNICATION SYSTEM WITH A STABILIZED "COMB" OF FREQUENCIES

Bernard Glance, Colts Neck, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 346,255, May 1, 1989, abandoned, which is a continuation of Ser. No. 59,973, Jun. 9, 1987, abandoned. This application Dec. 21, 1989, Ser. No. 455,898

Int. Cl.[5] H04J *14/02;* **H04B** *10/04*

U.S. Cl. 370—3 **6 Claims**



1. An optical communication system to process at least three intelligence-bearing, frequency-multiplexed, modulated optical signals comprising:

means for frequency multiplexing the at least three signals,

at least one Fabry-Perot cavity with resonances at the frequencies of the at least three signals and with which cavity the signals interact,

means for applying a dithering frequency to at least one of the at least three signals to yield at least one dithered signal,

a feedback loop associated with the at least one dithered signal to generate an error signal proportional to drifting of at least one detected parameter of the at least one dithered signal, and

means for adjusting a device in response to the error signal.

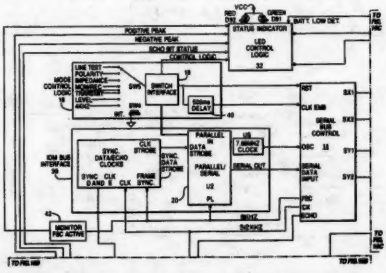
4,989,202
ISDN TESTING DEVICE AND METHOD

Roy L. Soto, Moorpark; Wiley J. Ehrke, and Robert J. Homkes, both of Camarillo, all of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Oct. 14, 1988, Ser. No. 257,686

Int. Cl.[5] G06F *11/20*

U.S. Cl. 370—13 **43 Claims**



1. A test device for an integrated services digital network (ISDN) system having a Network Terminator (NT), a system/terminal (S/T) interface for coupling the NT to a Terminal Equipment (TE), a transmit line between the S/T interface and the NT to permit a TE coupled to the S/T interface to transmit D channel and B channel information to the NT, and a receive line coupled between the NT and S/T interface to permit a TE coupled to the S/T interface to receive D channel and B channel information from the NT, said test device comprising:

means for coupling the test device to the S/T interface;

means for performing an initial line connection test to determine if a satisfactory line connection exists between the NT and the S/T interface connected by the transmit and receive lines by providing a predetermined signal to the NT from the test device and for evaluating a response from the NT to the predetermined signal, including means to indicate a satisfactory line connection between the S/T interface and the NT if the response from the NT is a predetermined response and for indicating an unsatisfactory line connection if the response is non-existent or is not said predetermined response; and

means for performing a plurality of additional tests after said initial line connection test to determine the location of a problem in said line connection if the initial line connection test indicates that the line connection between the S/T interface and the NT is unsatisfactory.

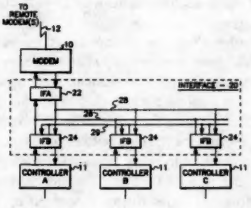
4,989,203
APPARATUS FOR PROVIDING MULTIPLE CONTROLLER INTERFACES TO A STANDARD DIGITAL MODEM AND INCLUDING SEPARATE CONTENTION RESOLUTION

Thomas L. Phinney, Boulder City, Nev., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 9, 1989, Ser. No. 363,844

Int. Cl.[5] H04J *3/04;* **H04B** *1/38*

U.S. Cl. 370—85.13 **29 Claims**



1. In a communication system, having a modem for providing an interface to a communication link, said communication system further having a plurality of controllers whereby each of said controllers is connected to said modem via an interface apparatus, and further wherein said modem and said controllers comply with a predetermined protocol, said interface apparatus comprising:

(a) first means, for providing a local medium to transfer signals between said controllers and said modem;

(b) second means, for providing an arbitration path between said controllers when at least one of said controllers is requesting access to said first means;

(c) first interface means, connected to said first means, for interfacing said modem to said first means, said first interface means implementing simple retiming of signals on said first means to maintain the predetermined protocol between said modem and said first interface means; and

(d) a plurality of second interface means, each of said second interface means being connected to said first and second means and to a corresponding controller, for interfacing each of said plurality of controllers to said first and second means, each of said interface means implementing a controller-associated multi-state state machine which responds to signals on said first and second means and further responds to signals from the corresponding controller, each of said second interface means maintaining the

predetermined protocol between the second interface means and the corresponding controller.

4,989,204

HIGH THROUGHPUT COMMUNICATION METHOD AND SYSTEM FOR A DIGITAL MOBILE STATION WHEN CROSSING A ZONE BOUNDARY DURING A SESSION

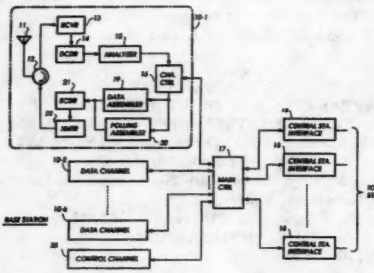
Toshimitsu Shimizu, and Yasuhiko Sako, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Feb. 9, 1989, Ser. No. 308,276

Claims priority, application Japan, Feb. 10, 1988, 63-29066; Feb. 10, 1988, 63-29067; Feb. 10, 1988, 63-29068; Jan. 26, 1989, 1-19037

Int. Cl.[5] H04J *3/00;* H04L *12/56*

U.S. Cl. 370—94.1 12 Claims



1. A digital radio communications systems comprising:

a central station;

a plurality of base stations connected to said central station, said base stations respectively covering service zones; and

a mobile station capable of transmitting up-direction data packets each containing a packet serial number through a first connection to a first one of said base stations, transmitting a reconnect request packet to a second one of said base stations when moving across a boundary between the service zones of said first and second base stations during transmission and transmitting a copy of up-direction data packets specified by a reconnect response packet from said second base station, said mobile station further transmitting a block serial number identifying a block of said data packets,

each of said base stations being capable of assembling said up-direction data packets into a data block according to said block serial number and transmitting the data block to said central station, said second base station being capable of communicating the receipt of said reconnect request packet to said central station and transmitting said reconnect response packet to said mobile station in response to a reconnect command packet from said central station, said first base station being capable of clearing said first connection in response to a proceed-to-clear command packet from said central station, and responding to said proceed-to-clear command packet by communicating to said central station the block serial number of a last data block which was sent from said mobile station to said first base station before it leaves the service zone of said first base station,

said central station being capable of transmitting said proceed-to-clear command packet to said first base station in response to a communication of the receipt of said reconnect request packet from said second base station, and transmitting said reconnect command packet to said second base station indicating said block serial number communicated from said first base station.

4,989,205

DISK DRIVE MEMORY

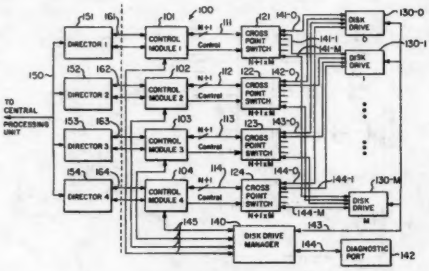
Robert H. Dunphy, Jr., Holland, Pa.; Robert Walsh, Boulder, Colo., and John H. Bowers, Clarksburg, N.J., assignors to Storage Technology Corporation, Louisville, Colo.

Division of Ser. No. 212,434, Jun. 28, 1988, Pat. No. 4,914,656.

This application Jan. 11, 1990, Ser. No. 463,591

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—10.1 36 Claims



1. A disk memory system (**100**) for storing data files for associated data processing devices comprising:

a plurality of disk drives (**130-0** to **130-M**);

means (**140**) for assigning a subset of said plurality of disk drives into two or more parity groups, each parity group consisting of two or more disk drives, the size of the parity group being one of at least two different parity group sizes in said two or more parity groups;

means (**101**) responsive to the receipt of a data file from said associated data processing devices for selecting one of said parity groups to store said data file thereon;

means (**161, 101, 111, 121, 141-•**) for writing said received data file and parity data associated with said received data file in segments across said two or more disk drives in said selected parity group;

means (**140**) for reserving one or more of said plurality of disk drives as backup disk drives, which backup disk drives are shared in common by said two or more parity groups.

4,989,206

DISK DRIVE MEMORY

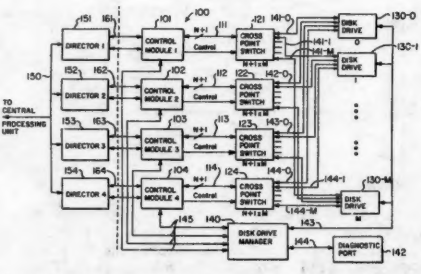
Robert H. Dunphy, Jr., Holland, Pa.; Robert Walsh, Boulder, Colo., and John H. Bowers, Clarksburg, N.J., assignors to Storage Technology Corporation, Louisville, Colo.

Division of Ser. No. 212,434, Jun. 28, 1988, Pat. No. 4,914,656.

This application Jan. 11, 1990, Ser. No. 463,512

Int. Cl.[5] G06F *11/20*

U.S. Cl. 371—10.1 58 Claims



1. A disk memory system for storing data files for associated data processing devices comprising:

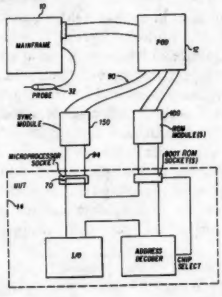
a plurality of disk drives;
means for assigning a subset of said plurality of disk drives into two or more parity groups, each parity group consisting of two or more disk drives;
means responsive to the receipt of a data file from said associated data processing devices for selecting one of said parity groups to store said data file thereon;
means for writing said received data file and parity data associated with said received data file in segments across said two or more disk drives in said selected parity group;
means for reserving one or more of said plurality of disk drives as backup disk drives, which backup disk drives are shared in common by said two or more parity groups;
means for identifying one of said disk drives in said subset that fails to function; and
means responsive to said identifying means for switchably connecting one of said backup disk drives in place of said identified failed disk drive;
means responsive to said identified failed disk drive being removed from said disk memory system and a new disk drive being substituted therein for placing said new disk drive in a pool of said plurality of disk drives that are presently unassigned by said assigning means and said reserving means.

4,989,207

AUTOMATIC VERIFICATION OF KERNEL CIRCUITRY BASED ON ANALYSIS OF MEMORY ACCESSES

John D. Polstra, Seattle, Wash., assignor to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Nov. 23, 1988, Ser. No. 275,183
Int. Cl.[5] G01R *31/28*; G06F *11/00*
U.S. Cl. 371—16.2 **11 Claims**



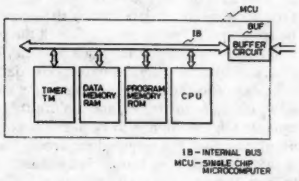
1. A method for verification of a unit under test having a microprocessor including prefetch logic comprising the steps of
providing an emulation memory for testing kernel circuitry of said unit under test,
loading a test program and corresponding checking table into said emulation memory,
causing said microprocessor to execute said test program,
monitoring the address of each memory access during execution of said test program,
identifying each address accessed as one of at least an instruction access and a data access,
determining if the address of each instruction access is greater than the preceding instruction access address,
determining if the address of each data access is greater than the preceding data access address,
determining if the address of each data access corresponds to a location of data specified in the most recently accessed instruction, and
establishing verification of said kernel circuitry based upon the results of said determining steps.

4,989,208

DATA PROCESSOR

Yasushi Akao, Ithaca, N.Y.; Shinkichi Hotta, Higashiyamato, and Haruo Keida, Tokorozawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 20, 1987, Ser. No. 39,695
Claims priority, application Japan, Apr. 23, 1986, 61-92031
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—18 **13 Claims**



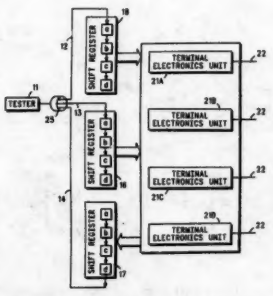
1. A data processor implemented only in a single-chip large-scale-integrated semiconductor device, said data processor to be tested by an external tester that produces test address and test control signals, said data processor comprising:
a central processing unit;
means for establishing a predetermined supply timing;
a plurality of functional blocks, said functional blocks being coupled within the device to said central processing unit electrically, said functioned blocks including RAM and ROM;
an internal bus means having a first current path for transferring data and address signals between said central processing unit and said functional blocks within the device;
said central processing unit being means for operating in a normal mode to access one of said functional blocks by supplying address and control signals to said internal bus means in accordance with the predetermined supply timing;
a buffer circuit having first circuit means for operating in a test mode transferring the test address signals of one of said functional blocks from the external tester to said functional blocks directly via said internal bus means bypassing said central processing unit for test operation in accordance with the predetermined supply timing.

4,989,209

METHOD AND APPARATUS FOR TESTING HIGH PIN COUNT INTEGRATED CIRCUITS

Hugh W. Littlebury, Chandler, and Mavin C. Swapp, Mesa, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 24, 1989, Ser. No. 328,258
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—22.1 **12 Claims**



1. An apparatus for transferring test data and response data

between a multi-channel tester and a logic circuit under test, the apparatus capable of operating in one of a plurality of modes, the logic circuit having a plurality of terminals, each terminal of the plurality of terminals is an input or an output depending on internal configuration of the logic circuit, the apparatus comprising: a plurality of segments which are similar to each other, each segment coupled between one test channel of the multi-channel tester and a subset of terminals of the circuit under test, wherein the test channel provides serial stimulus data to the segment and analyzes serial response data from the segment, each segment including a first converter means having a serial input and a plurality of parallel outputs for dividing the serial stimulus data among the subset of terminals when the apparatus is operating in a first of the plurality of modes, a second converter means having a plurality of parallel inputs and a serial output for assembling response data from the subset of terminals to form the serial response data and sending the serial response data to the tester, and a plurality of terminal electronic units which are similar to each other connected to each logic circuit terminal, the terminal electronic units further comprising a latching means to temporarily store the divided stimulus data from the first converter means, a means to force a logic signal on an input logic circuit terminal controlled by the divided stimulus data stored in the latching means, a comparator to compare a response voltage at an output terminal to a reference voltage and output the response data to the second converter means.

4,989,210

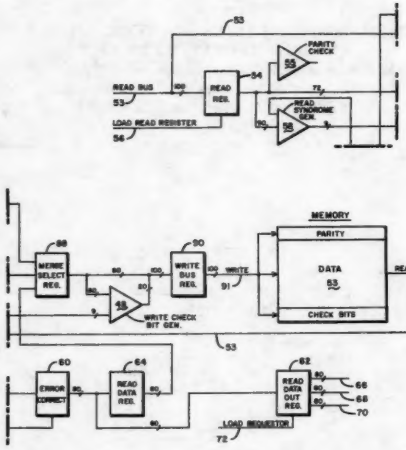
PIPELINED ADDRESS CHECK BIT STACK CONTROLLER

James H. Scheuneman, St. Paul; Paul L. Peirson, Forest Lake, and Michael E. Mayer, Fridley, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Continuation of Ser. No. 238,084, Aug. 30, 1988, abandoned. This application Mar. 19, 1990, Ser. No. 499,231

Int. Cl.[5] **G06F** *11/10*

U.S. Cl. 371—40.1 **1 Claim**



1. An address bit controller for an addressable memory system which is shared by a plurality of requesting processors, each of which processors is capable of supplying sets of signals which represent either read, or write or partial write address to enable writing information into, or reading information from, said memory system during read, write and partial write operations, comprising:

addressing means for receiving sets of address signals from said processors and for storing binary bit representations of said sets of address signals,

address read check generator means coupled to said addressing means for generating read address check bits when a set of address signals received by said addressing means represents a read address,

address write check bit generator means coupled to said addressing means for generating write address check bits when a set of address signals received by said addressing means represents a write address,

controllable stack means for loading and storing said read address check bits and said write address check bits under the control of load address signals, said stack means being constructed to selectively read out said write address check bits during a write operation under the control of write pointer signals, to selectively read out from said stack means said read address check bits during read and partial write operations under the control of read pointer signals and to selectively read out from said stack means said write address check bits during partial write operations under the control of partial write pointer signals,

sequencer means coupled to said stack means for supplying sequences of signals in which each sequence comprises load address, write pointer, read pointer and partial write pointer signals each time an address signal is received by said addressing means from one of said processors, wherein said write pointer signal precedes said read pointer signal by a fixed time, said read pointer signal precedes said partial write pointer signal by a fixed time, and said load address signals precede said pointer signals by a fixed amount in each of said sequences,

addressable memory means having provisions for storing data bits and write address check bits at addresses selected by the address signals received from said processors during said write operations, and for reading data bits and said stored check bits from addresses selected by the address signals received from said processors write during read and partial write operations,

read means coupled to said processors and to addressable memory means for receiving read data addresses from said processors and for reading data and associated check bits from addresses of said memory means selected by said processors,

write means coupled to said processors and to said addressable memory means for receiving write data from said processors for writing either full data words or partial data words into said addressable memory means during write and partial write operations, respectively, at addresses selected by said processors, comprising merge means coupled to said read means for receiving read data therefrom for selectively either writing write data into said memory means during a write operation or for merging write data with read data and writing merged data into said memory means during a partial write operation, and further coupled to receive said write address check bits from said stack means for storing write check bits into said memory means at addresses which correspond to associated data words that are written into said memory means,

write check generator means coupled to said stack means for receiving write address check bits from said stack means and to said write means for receiving write data to be written into said memory means that is associated with said write address check bits, which is constructed to generate said write check bits and to supply said write check means to said write means,

read syndrome generator means coupled to said read means for receiving said stored check bits read from said mem-

ory means and to said stack means for receiving said read address check bits associated with the addresses of data read from said memory means,

error correction means coupled to said read syndrome generator means for receiving the output of said syndrome generator means constructed to detect at least some data and stored check bit errors and to correct at least some of said data bit errors, said error correction means being further coupled to said write means for coupling the output of said error correction means to said merge means during said partial write operation, and

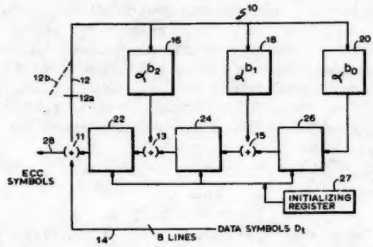
data output means coupled to said error correction means for receiving the output of said error correction means during read operations and for supplying said output from said error correction means to said processors during a read operation.

4,989,211

SECTOR MIS-SYNCHRONIZATION DETECTION METHOD

Lih-Jyh Weng, Lexington, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed May 12, 1988, Ser. No. 193,109
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—42 **6 Claims**



1. A method for detecting mis-synchronization for use with an encoder which encodes symbols in accordance with a generator polynomial g(x) and produces redundancy symbols corresponding to the symbols, said method comprising the steps of:

A. encoding a string of symbols comprising a predetermined number of selected preliminary symbols and a predetermined number of data symbols to produce redundancy symbols which correspond to the symbol string;

B. concatenating the data symbols and the redundancy symbols to form a code word and recording the code word;

C. retrieving said code word;

D. encoding a string of symbols comprising the preliminary symbols and the retrieved code word data symbols to produce redundancy symbols which correspond to the symbol string; and

E. comparing the redundancy symbols generated in step D with the redundancy symbols in the retrieved code word and if the symbols do not match, (i) finding the locations of errors associated with the code word, and (ii) signalling a mis-synchronization if any error locations are outside the code word.

4,989,212

LASER DIODE PHASE MODULATION TECHNIQUE

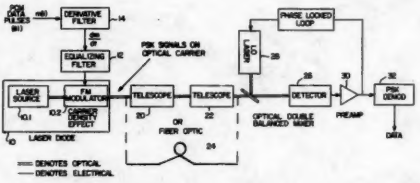
George S. Mecherle, Hawthorne, Calif., assignor to TRW, Inc., Redondo Beach, Calif.

Filed Apr. 9, 1990, Ser. No. 506,637
Int. Cl.[5] H01S *3/10*
U.S. Cl. 372—26 **8 Claims**

1. A method of optical phase modulation, comprising the steps of:

differentiating a time-varying input data signal with respect to time;

generating an optical carrier signal in a laser diode; and



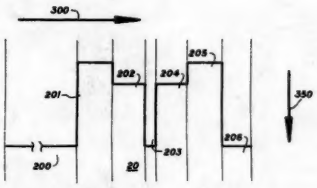
modulating the optical carrier signal with the time-differentiated, data signal, whereby the laser diode operates to frequency-modulate the time-differentiated data signal, which is equivalent to phase modulation of the data signal.

4,989,213

NARROW DIVERGENCE, SINGLE QUANTUM WELL, SEPARATE CONFINEMENT, ALGAAS LASER

Thomas E. Haw, Jamaica Plain; Jeannie E. Williams, Lynnfield, and Munib A. Wober, Haverhill, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 30, 1989, Ser. No. 428,833
Int. Cl.[5] H01S *3/19*
U.S. Cl. 372—45 **4 Claims**



1. In a structure for a narrow divergence, single quantum well, separate confinement, laser, of the type which comprises an n-AlGaAs cladding epitaxial layer, a first AlGaAs waveguide epitaxial layer, a GaAs quantum well active epitaxial layer, a second AlGaAs waveguide epitaxial layer, a p-AlGaAs cladding epitaxial layer, and a GaAs cap epitaxial layer, all sequentially grown with respect to each other, the improvement comprising:

said n-AlGaAs cladding layer dimensioned to a thickness which is greater than 2 microns and doped to a density less than $5\times10^{18}/cm^3$; said first AlGaAs waveguide layer dimensioned to a thickness in a range between 400 and 700 Angstroms; said GaAs quantum well layer dimensioned to a thickness in a range between 50 and 200 Angstroms; said second AlGaAs waveguide layer dimensioned to a thickness in a range between 400 and 700 Angstroms; and said p-AlGaAs cladding layer dimensioned to a thickness which is greater than 2.0 microns and doped to a density less than $5\times10^{18}/cm^3$.

4,989,214

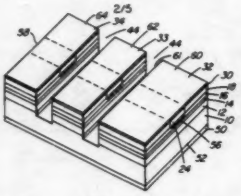
LASER DIODE, METHOD FOR MAKING DEVICE AND METHOD FOR MONITORING PERFORMANCE OF LASER DIODE

Peter T. H. Kwa, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed May 11, 1990, Ser. No. 522,015
Int. Cl.[5] H01S *3/19*
U.S. Cl. 372—50 **15 Claims**

1. A monolithically integrated structure comprising a laser

diode, a photodetector diode and a reference diode monolithically integrated on a common substrate, the photodetector



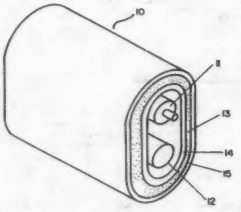
diode being optically coupled to the laser diode, and the reference diode being substantially identical to the photodetector diode and optically decoupled from the laser diode.

4,989,215

LASER PUMPING CAVITY

Michael Winik, Mskeret Batia, Israel, assignor to El-Op Electro-Optics Industries Ltd., Rehovot, Israel

Filed Feb. 1, 1989, Ser. No. 304,463
Claims priority, application Israel, Aug. 8, 1988, 087370
Int. Cl.[5] H01S *3/091*
U.S. Cl. 372—70 **7 Claims**



1. A laser pumping cavity comprising
a laser material,
a light source optically coupled to said laser material for the excitation of said laser material thus establishing an optical gain in said laser material of infra-red, visible or ultraviolet waves,
a bi-functional fluorescent diffuse-reflector illuminated by said light source surrounding at least part of the laser pumping cavity, which diffuse reflector comprises crystallites of a fluorescent material, which crystallites reflect back into the laser pumping cavity radiation of a pumping wavelength, and which convert by fluorescence radiation outside the pumping wavelength into radiation of pumping wavelengths of said laser material, said fluorescent diffuse-reflector including a fluorescent powder.

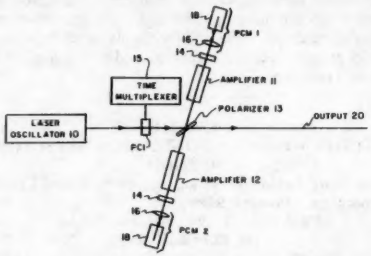
4,989,216

DOUBLE CONJUGATE LASER AMPLIFIER

Suresh Chandra, Falls Church, and Geraldine H. Daunt, Arlington, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 18, 1990, Ser. No. 500,963
Int. Cl.[5] H01S *3/082*
U.S. Cl. 372—97 **16 Claims**

1. A double conjugate laser amplifier system for producing a stable output laser beam in line with a laser oscillator input beam, said system comprised of:
a laser oscillator which produces a low energy oscillator laser beam therefrom directly along a laser beam axis of said system;
an amplification means comprised of a plurality of double conjugate laser amplifiers further comprised of a first and a second singly phase conjugate amplifiers laterally opposite each other about said laser beam axis;
a plurality of polarizers with one of said plurality of polarizers positioned between each of said first and second singly phase conjugate amplifiers on said laser beam axis;
a plurality of Pockels cells with one of said plurality of Pockels cells positioned on said laser beam axis immediately prior to one of said plurality of polarizers; and
a means for selectively switching said amplifier means comprised of applying a half-wave voltage at each of said



plurality of Pockels cells to provide a polarization rotation of said input beam through 90° for routing of said oscillator laser beam directly through or reflected off said plurality of polarizes as an input beam to said amplification means wherein said amplification means amplifies said input beam twice in each of said first and second singly phase conjugate amplifiers and reflects the amplified laser beam off said plurality of polarizers as an amplified laser output beam in exactly the same direction as said input laser beam.

4,989,217

LASER RESONATOR

Kevin Ostler, Salt Lake City, Utah, assignor to Ion Laser Technology, Salt Lake City, Utah

Filed Feb. 12, 1990, Ser. No. 479,077
Int. Cl.[5] H01S *3/08*
U.S. Cl. 372—107 **20 Claims**

1. An apparatus for supporting optical elements, which apparatus compensates for changes in the index of refraction of those elements over a predetermined range of temperature, said apparatus comprising:
at least two spaced longitudinal members having predetermined individual coefficients of thermal expansion, said longitudinal members being joined by at least one spaced transverse member, said at least one spaced transverse member being capable of supporting at least one optical element in an operable alignment such that thermal expansion of said longitudinal members results in a change in the alignment of said optical element which compensates for thermally induced changes in the refractive index of said at least one said optical element.

4,989,218

INDUCTION HEATING TYPE METAL MELTING21FURNACE

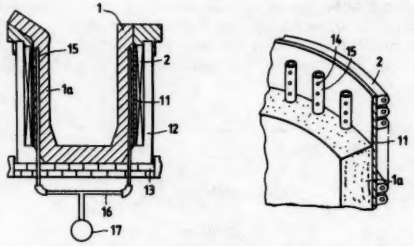
Masao Tateno, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Mar. 12, 1990, Ser. No. 492,484
Claims priority, application Japan, Mar. 13, 1989, 1-60108
Int. Cl.[5] H05B *6/06*
U.S. Cl. 373—145 **8 Claims**

1. An induction furnace, comprising:
a furnace body including a base, and a furnace wall projecting upwardly from the base having an outer peripheral surface;

a coil wrapped about said outer peripheral surface of said furnace wall;

a plurality of passageways chased in said furnace wall and penetrating said outer peripheral surface;



a common pipe connecting said plurality of passageways external to said furnace body; and

a gas conveying unit attached to said common pipe external to said furnace body.

4,989,219

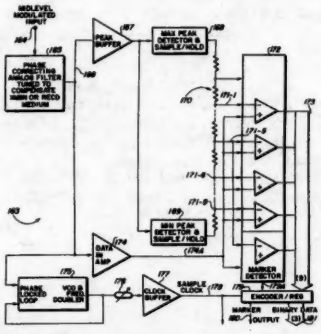
MIDLEVEL CARRIER MODULATION AND DEMODULATION TECHNIQUES

Richard C. Gerdes, 4645 E. Quivira, Tucson, Ariz. 85718, and Peter R. Vokac, 7835 N. Avenida Carlotta, Tucson, Ariz. 85704

Continuation-in-part of Ser. No. 590,281, Mar. 16, 1984, Pat. No. 4,613,974. This application Sep. 22, 1986, Ser. No. 910,086

Int. Cl.[5] H04L *27/02*

U.S. Cl. 375—17 **41 Claims**



22. A circuit for providing a midlevel modulated carrier signal having a plurality of midrange levels in a plurality of respective rising and falling transitions thereof, the circuit comprising:

(a) means for providing a first signal having a first frequency and means for providing a second signal which has a fixed phase relationship to the first signal and has a second frequency that is an integral multiple of the first frequency;

(b) means for producing a relative shift between the phases of the first and second signals in accordance with the levels of an analog modulation signal; and

(c) summing means for summing the first and second signals to produce the midlevel modulated carrier signal with respective midrange levels in each rising transition and falling transition of the modulated carrier signal, each midrange level representing a corresponding valve of the analog modulation signal.

4,989,220

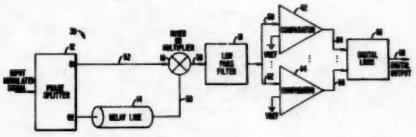
METHOD AND APPARATUS FOR DEMODULATING A CLASS OF M-ARY PHASE SHIFT KEYED (PSK) SIGNALS

Michael J. Serrone, Sunnyvale, Calif., assignor to First Pacific Networks, Sunnyvale, Calif.

Filed Feb. 28, 1989, Ser. No. 317,167

Int. Cl.[5] H04L *27/22*

U.S. Cl. 375—83 **8 Claims**



3. A method for demodulating a modulated M-ary phase shift keyed (MPSK) signal wherein modulation is constrained to phase transitions between adjacent phase states, said method comprising the steps of:

dividing a source signal into two paths with a preselected phase relationship among a first phase component and a second phase component;

delaying said second phase component by nominally one bit period to produce a delayed-phase component;

mixing a representation of the delayed-phase component and said first phase component to produce a mixed signal;

low-pass filtering said mixed signal to produce a filtered signal;

comparing said filtered signal against different preselected decision thresholds in at least two comparator means to produce a digital output signal;

identifying different signal levels of said mixed signal; and

analyzing said different signal levels of said two-level comparator means in order to combine said outputs of said two-level comparator means to produce said digital output signal.

4,989,221

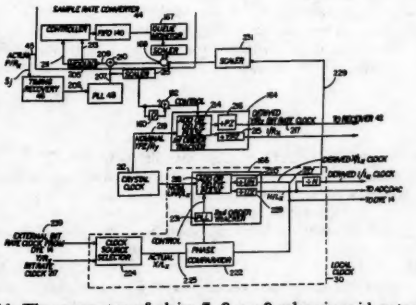
SAMPLE RATE CONVERTER

Shahid U. H. Qureshi, Natick, and Fuyun Ling, Jamaica Plain, both of Mass., assignors to Codex Corporation, Mansfield, Mass.

Continuation of Ser. No. 32,165, Mar. 30, 1987, abandoned. This application Nov. 2, 1989, Ser. No. 431,712

Int. Cl.[5] H04B *1/38*

U.S. Cl. 375—8 **24 Claims**



14. The apparatus of claim 7, 8, or 9 wherein said output

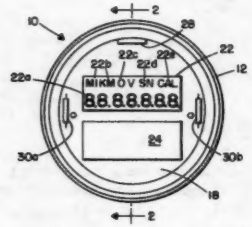
stream has a sample rate that differs from the sample rate of said input stream.

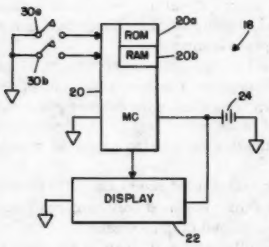
4,989,222

ELECTRONIC HUBODOMETER

William P. Lutts; Thomas A. Diefenbaker, both of Richardson, and George Fedorovich, Longview, all of Tex., assignors to Stemco Inc., Longview, Tex.

Filed May 22, 1989, Ser. No. 355,952
Int. Cl.[5] G01C *22/00*
U.S. Cl. 377—24.1 **29 Claims**





1. Apparatus for attachment to a structure for sensing a rotation of the structure, the apparatus comprising a first portion having means for coupling to the structure such that the first portion rotates therewith, the apparatus further including a second portion stabilized against rotation and disposed relative to the first portion such that the first portion rotates about the second portion, the first portion including an object and the second portion including a plurality of sensor means each of which has an output for indicating the presence of the object in proximity thereto, the plurality of sensor means being disposed relative one to another such that all of the sensor means do not simultaneously sense the presence of the object as it rotates thereby, the apparatus further including means coupled to the sensor means outputs for converting output signal therefrom to distance-related information, the converting means including means for determining that the first portion has undergone one revolution relative to the second portion, the determining means being responsive to a predetermined number of the sensor means sensing the proximity of the object in a predetermined sequence for discriminating against a transient motion that would otherwise affect a single sensor means relative to the object.

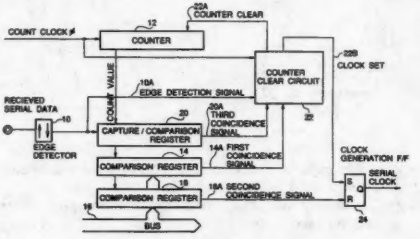
4,989,223

SERIAL CLOCK GENERATING CIRCUIT

Tsuyoshi Katayose, and Yukio Machashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,112
Claims priority, application Japan, Nov. 25, 1988, 63-298512
Int. Cl.[5] H04L *7/00*
U.S. Cl. 377—39 **7 Claims**

1. A serial clock generating circuit for generating a serial clock in phase with a clock included in a received serial data on the basis of an input clock having a frequency N times of a serial data transfer rate of the received serial data, comprising means for detecting a level transition of the received serial data so as to generate a level transition detection signal, means for counting the input clock first comparison means for comparing a count value of the count means with a first programmable predetermined value at each one counting operation of the count means, so as to generate a first coincidence signal when the count value of the count means if coincident with the first programmable predetermined value, second comparison means for comparing the count value of the count means with a second programmable predetermined value at each one counting operation of the count means so as to generate a



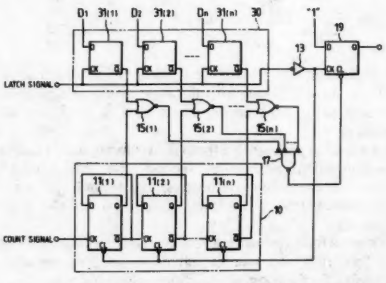
second coincidence signal when the count value of the count means is coincident with the second programmable predetermined value, third comparison means having a first function of capturing and storing the count value of the count means when the level transition detection signal is generated, and a second function of comparing the count value of the count means with the stored count value at each one counting operation of the count means, so as to generate a third coincidence signal when the count value of the count means is coincident with the stored count value, means for generating a clear signal to the count means so as to clear the count means when either the first coincidence signal or the third coincidence signal is generated, and means for generating a serial clock signal on the basis of the second coincidence signal and the clear signal.

4,989,224

COINCIDENCE CIRCUIT

Mitsumasa Narahara; Kazumi Yamauchi; Yuji Yatsuda; Shinichi Yasunaga, all of Kanagawa; Fujio Moriguchi, and Nobuhisa Kato, both of Saitama, all of Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 29, 1988, Ser. No. 277,172
Claims priority, application Japan, Dec. 1, 1987, 62-301568
Int. Cl.[5] H03K *21/10*
U.S. Cl. 377—39 **3 Claims**



1. A current control circuit for controlling the supply of current to a plurality of resistors for use in a thermal print head in a printing of an image corresponding to n-bit image data comprising:

a counter for producing n-bit count data;

a coincidence circuit for judging a coincidence between bits of the n-bit image data and corresponding bits of the n-bit count data, the coincidence circuit including, a plurality of single value detecting circuits for detecting that corresponding bits of the n-bit image data and the n-bit count data have a predetermined value, and

a first coincidence judging circuit for determining a coincidence between the n-bit image data and the n-bit count data by detecting a first time that said single value detecting circuits corresponding to all bits of said n-bit image data having said predetermined value have detected that said corresponding bits of said n-bit image data and said n-bit count data have said predetermined value during an up-counting of said counter; and

a switching circuit for controlling the supply of current to said resistors in accordance with a count signal of said counter at a time when said first coincidence judging circuit determines that all of said single bit detecting circuits have detected that said corresponding bits of said n-bit image data and said n-bit count data have said predetermined value.

4,989,225

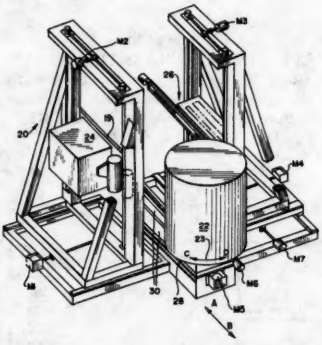
CAT SCANNER WITH SIMULTANEOUS TRANSLATION AND ROTATION OF OBJECTS

Nand K. Gupta, Libertyville, and John F. Moore, Lake Bluff, both of Ill., assignors to Bio-Imaging Research, Inc., Ill.

Filed Aug. 18, 1988, Ser. No. 233,566

Int. Cl.[5] H05G *1/00*

U.S. Cl. 378—10 **22 Claims**



1. A computed tomography scanner comprising a source of penetrating energy, detector means positioned to receive said rays from said source, means for translating an object along a translation path to interpose said object between said source and said detector, computer means responsive to said detector for constructing a tomographic image of said object, said means for rotating said object concurrently with said translation.

4,989,226

LAYERED DEVICES HAVING SURFACE CURVATURE

Richard C. Woodbury; Raymond R. Perkins; James M. Thorne, and Larry V. Knight, all of Provo, Utah, assignors to Brigham Young University, Provo, Utah

Division of Ser. No. 87,778, Aug. 21, 1987. This application Oct. 23, 1989, Ser. No. 425,286

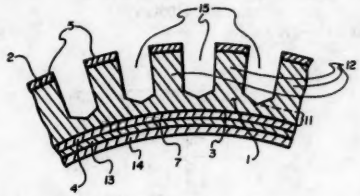
Int. Cl.[5] G21K *1/00*; G01N *21/23*; G02B *5/10, 5/126*

U.S. Cl. 378—145 **5 Claims**

1. A device for directing electromagnetic radiation comprising

a substrate having first and second sides and corresponding oppositely facing first and second surfaces, said substrate further having a predetermined pattern of areas on said second side from which substrate material has been removed, and

a stress-producing film of material coated on at least one of the surfaces of the substrate,



wherein said film in combination with said areas on said second side from which substrate material has been removed, bends said substrate to a desired curvature so that said first surface reflects electromagnetic radiation.

4,989,227

CASSETTE CARRIER ADAPTABLE IN SIZE AND POSITION FOR MAMMOGRAPHY

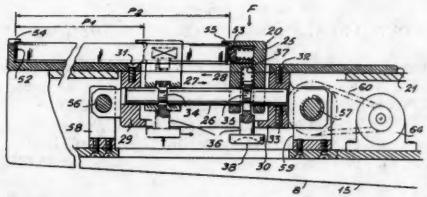
Marco Tirelli, Palaiseau; Didier Rouchy, Les Clayes Sous Bois, and Jean-Claude Rapeau, Velizy Villacoublay, all of France, assignors to General Electric CGR S.A., Issy les Molineaux, France

Filed Mar. 23, 1990, Ser. No. 497,709

Claims priority, application France, Apr. 28, 1989, 89 05666

Int. Cl.[5] G03B *42/02*

U.S. Cl. 378—177 **4 Claims**



1. A cassette carrier for supporting a cassette on a table, the cassette containing at least one sensitive film, and the cassette carrier comprising :

a plate member which is mounted to move relative to the table in a first direction by virtue of a first displacement mechanism;

a sliding member which is mounted to move relative to the plate member by virtue of a second displacement mechanism and in a second direction perpendicular to the first; and

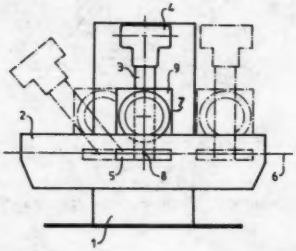
means associated with the sliding member holding the cassette in position relative to the plate member and for adapting to the dimensions of the cassette, Wherein said first displacement mechanism comprises at least two guides slidably supporting tabs integral with the plate member, one of the guides being threaded and co- operating with a drive nut in such a manner that rotation of the threaded guide causes the plate member to be displaced in a desired direction, the second guide being smooth.

4,989,228

RADIOLOGICAL EXAMINATION DEVICE

André E. Louiday, Le Pacq, France, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Jun. 2, 1989, Ser. No. 360,959
Claims priority, application France, Jun. 10, 1988, 88 07776
Int. Cl.[5] H05G 1/02
U.S. Cl. 378—196 6 Claims



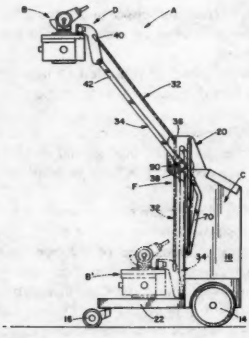
1. A radiological examination device, comprising a base which supports a parallelepiped patient table having a longitudinal axis, said table including a longitudinal sliding rail having a mobile part, a motor block provided with a horizontal drive shaft whose longitudinal axis extends transversely of the patient table, a linear support for the motor block and displacement means which are linked to the motor block, characterized in that the displacement means comprises a motor block which is displaceable on said linear support in the longitudinal direction of the patient table, a drive chain which is secured to the motor block and which forms a closed loop therewith, said chain driving upon displacement of the motor block on its linear support, a column either in a translatory mode on the longitudinal sliding rail of the patient table, or in a rotary mode about a shaft of the column, horizontally and transversely of the table, supported by the mobile part of the sliding rail, the column supporting an imaging system composed of an X-ray source and a serialographic unit.

4,989,229

COUNTERBALANCE ASSEMBLY FOR DIAGNOSTIC IMAGING EQUIPMENT

Donald E. Negrelli, Gates Mills; Donald E. Kolbfleisch, Burton, and Anthony D. Szpak, Parma, all of Ohio, assignors to Picker International, Inc., Highland Heights, Ohio

Filed Nov. 22, 1989, Ser. No. 441,041
Int. Cl.[5] H05G 1/02, 1/06; F16L 3/00; E04G 3/00
U.S. Cl. 378—198 23 Claims



9. A counterbalance assembly for supporting diagnostic imaging equipment, the assembly comprising:

a base member;

a mounting member adapted to receive diagnostic imaging equipment;

first and second arms interposed between the base member and the mounting member for varying the dimension between the base member and mounting member and maintaining a parallel relationship therebetween;

fluid biasing means operatively associated with the first arm for urging the mounting member toward a first location;

a clutch means interposed between the mounting member and the base member for inhibiting movement of the mounting member toward the first location; and

locking means for selectively actuating the clutch means.

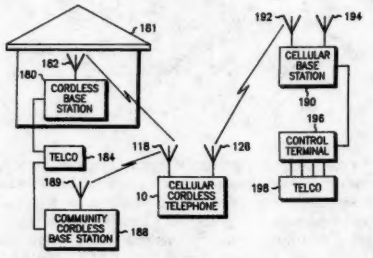
10. The counterbalance assembly as set forth in claim 9 wherein the fluid biasing means includes a gas cylinder assembly having a cylinder receiving a piston therein dividing the cylinder into first and second chambers, a rod extending outwardly from one face of the piston and through the cylinder for operative connection with the first arm, and a passage defined through the piston for establishing communication between the first and second chambers.

4,989,230

CELLULAR CORDLESS TELEPHONE

Steven F. Gillig, Roselle, and Glen E. Pederson, St. Charles, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 23, 1988, Ser. No. 249,041
Int. Cl.[5] H04B 1/40; H04Q 7/04
U.S. Cl. 379—59 20 Claims



1. A cellular cordless telephone for making and receiving cellular telephone calls on cellular radio channels of a cellular telephone system and cordless telephone calls on at least one cordless radio channel of a base station coupled to a telephone landline having a landline telephone number, said cellular cordless telephone comprising in combination as a single unit:

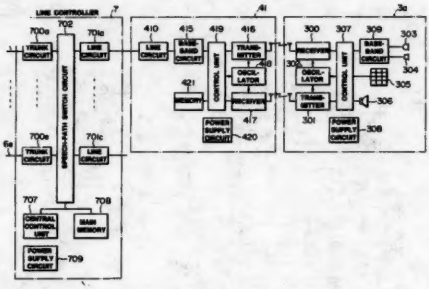
a cellular telephone including a first antenna, cellular transceiver means having a cellular telephone number and being coupled to said first antenna for communicating cellular telephone calls on cellular radio channels, and control means coupled to said cellular transceiver means for making and receiving cellular telephone calls; and

cordless transceiver means including a second antenna for communicating cordless telephone calls on the cordless radio channel, and said control means further being coupled to said cordless transceiver means for making and receiving cordless telephone calls.

4,989,231
MOBILE COMMUNICATION SYSTEM AND ITS CONTROL METHOD

Tuguo Ishikawa, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 27, 1989, Ser. No. 328,657
Claims priority, application Japan, Mar. 31, 1988, 63-79698
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—59 **16 Claims**



1. A mobile communication system comprising:

a plurality of mobile transceivers;

a plurality of radio circuits being capable of operating on a plurality of speech channels;

a plurality of fixed transceivers coupled through the radio circuits to the mobile transceivers;

a line controller coupled to a plurality of wired telephone lines and coupled to the fixed transceivers, including memory means for storing and outputting from time to time a used speech channel list;

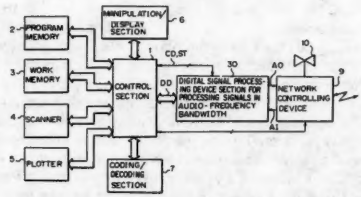
first informing means, responsive to a call from the wired telephone lines or a call from a mobile transceiver and responsive to the list of used speech channels, for informing a fixed transceiver, proximate to a called or calling mobile transceiver, of the current used speech channel list; and

means, responsive to the list of used speech channels, for setting a speech channel between the fixed transceiver and the mobile transceiver, including circuitry in each of the fixed transceivers for selecting a speech channel.

4,989,232
DEVICE FOR PROCESSING DIGITAL SIGNAL IN AUDIO-FREQUENCY BANDWIDTH

Naoki Tsumura, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,074
Claims priority, application Japan, Nov. 18, 1987, 62-289552
Int. Cl.[5] H04M *1/64, 11/00*
U.S. Cl. 379—88 **14 Claims**



11. A digital signal processing device for processing signals in audio-frequency bandwidth, said device comprising:

(a) digital input-output interface menas for transmitting first digital data to an external digital processing device and receiving second digital data therefrom,

(b) digital signal processing means for executing function/-control processing of said digital signal processing device, said digital signal processing means employing either one of a MODEM function processing program and a voice-coding/synthesizing function program in accordance with an external command,

(c) analog input-output interface means for transmitting and receiving digital data between said digital signal processing means and said analog input-output interface means, transmitting first analog data to an analog processing device and receiving second analog data therefrom,

(d) data memory means for forming a work area therein, said work area being employed for temporarily storing a voice message, and

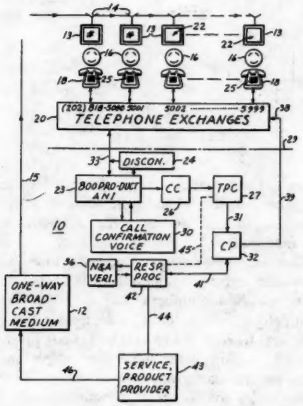
(e) program memory means for storing said MODEM function processing program for said digital signal processing means to realize a digital MODEM function and said voice-coding/synthesizing function program for said digital signal processing means to realize said voice-coding/-synthesizing function,

wherein said digital signal processing device transmits a predetermined voice message to a communication partner and thereafter the operation thereof transfers to control of facsimile transmitting/receiving function and starts to receive image information from said communication partner.

4,989,233
SYSTEMS FOR CAPTURING TELEPHONIC MASS RESPONSES

Harvey E. Schakowsky, Los Angeles, Calif., and Gilbert W. Bell, Lilburn, Ga., assignors to Evanston Enterprises, Inc., Studio City, Calif.

Continuation-in-part of Ser. No. 336,657, Apr. 11, 1989. This application Oct. 20, 1989, Ser. No. 424,804
Int. Cl.[5] H04M *1/57, 3/50*
U.S. Cl. 379—92 **38 Claims**



1. A method of enhancing response to a broadcast promotion, comprising in combination the steps of:

broadcasting said promotion over an essentially one-way mass medium;

prompting recipients of that broadcast promotion to respond thereto through their telephone sets having different subscriber telephone numbers;

at a plurality of locations, automatically receiving calls of recipients using their telephone sets to respond to said broadcast promotion, electronically capturing the sub-

scriber telephone numbers of the telephone sets through which said calls are made, and automatically confirming to substantially all callers while on line during said calls that their calls have been received;

at said plurality of locations, subsequently using the electronically captured subscriber telephone numbers to call on multitudes of the telephone sets at a time, electronically prompting all persons who answer the calls on said multitudes of telephone sets to complete their responses to the broadcast promotion through their telephone sets while on line, and automatically receiving the completed responses while on line with said persons through their telephone sets; and

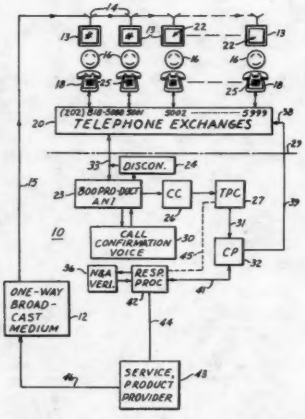
communicating with said plurality of locations and polling information generated by said received calls and said returned calls.

4,989,234

SYSTEMS FOR CAPTURING TELEPHONIC MASS RESPONSES

Harvey E. Schakowsky, Los Angeles, Calif., and Gilbert W. Bell, Lilburn, Ga., assignors to Evanston Enterprises, Inc., Studio City, Calif.

Filed Apr. 11, 1989, Ser. No. 336,657
Int. Cl.[5] H04M *1/57, 3/50*
U.S. Cl. 379—92 **29 Claims**



1. A method of enhancing response to a broadcast promotion, comprising in combination the steps of:

broadcasting said promotion over an essentially one-way mass medium;

prompting recipients of that broadcast promotion to respond thereto through their telephone sets having different subscriber telephone numbers;

automatically receiving calls of recipients using their telephone sets to respond to said broadcast promotion, electronically capturing the subscriber telephone numbers of the telephone sets through which said calls are made, and automatically confirming to substantially all callers while on line during said calls that their calls have been received;

subsequently using the electronically captured subscriber telephone numbers to call on multitudes of the telephone sets at a time until substantially all of said calls have been returned;

electronically prompting all persons who answer the calls on said multitudes of telephone sets to complete their responses to the broadcast promotion through their telephone sets while on line; and

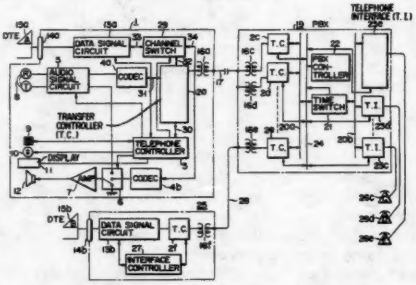
automatically receiving the completed responses while on line with said persons through their telephone sets.

4,989,235

INTEGRATED COMMUNICATION SYSTEM FOR ENSURING EFFECTIVE USE OF CHANNELS

Junichiro Nemoto, Hachioji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 24, 1989, Ser. No. 327,623
Claims priority, application Japan, Mar. 31, 1988, 63-78718
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—96 **12 Claims**



1. An integrated communication system, comprising:

a plurality of telephone units;

at least one data terminal;

switching means for selectively connecting the plurality of telephone units and the data terminal to transfer a frame comprising fixed length message portions, each of the message portions carrying information; and

an external controller connected to a first telephone of the plurality of telephones, the data terminal, and the switching means, the external controller comprising a data path for transferring data information carried on a first message portion to and from the data terminal, a main speech path for transferring audio information carried on a second message portion to and from the first telephone, and an optional speech path for transferring interrupt information to one of the telephones;

wherein the switching means includes an optional control means for assigning interrupt information to the first message portion, whereby the first message portion carries data information and interrupt information.

4,989,236

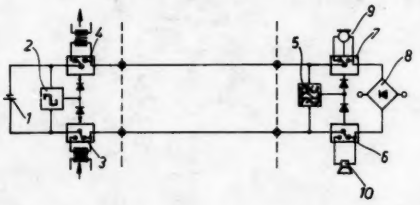
TRANSMISSION SYSTEM FOR TELEPHONE COMMUNICATIONS OR DATA TRANSFER

Matti Myllymäki, Espoo, Finland, assignor to Sostel Oy, Espoo, Finland

Filed Jan. 6, 1989, Ser. No. 294,390
Claims priority, application Finland, Jan. 18, 1988, 880189
Int. Cl.[5] H04L *5/14*
U.S. Cl. 379—98 **16 Claims**

1. A transmission system for telephone communications comprising at least two telephone sets, each incorporating microphone (**9**) and a receiver and/or loudspeaker (**10**), a telephone line connecting the telephone sets by two conductors in order to form a current loop, an alternating-current signal generator (**2**) and current-steering switch elements (**3, 4; 6, 7** or **11**) connected to the telephone sets and the conductors, arranged to steer the current to be routed during the positive half-cycles generated by the generator via the microphone circuit (**9**) of the first set and the receiver and/or loudspeaker circuit (**10**) of the second set as well as to steer the current during the negative half-cycles via the receiver and/or loudspeaker circuit (**10**) of the first set and the microphone circuit

(9) of the second set, whereby voice transmission takes place by sampling the microphone signals of the interconnected telephone sets and transmitting the alternate signal samples superimposed on the generator signal so that the microphone signal of the first set is superimposed on the positive half-cycles of the generator signal while the microphone signal of the second set is superimposed on the negative half-cycles of the



generator signal, characterized in that said current-steering switch elements are connected between a current loop comprising but two conductors, and a microphone circuit (9) and a receiver and/or loudspeaker circuit (10) at the telephone sets so as to prevent bidirectional current paths between the microphone circuit and the receiver and/or loudspeaker circuit within a single telephone set, while allowing only a unidirectional current path of the current loop through said circuits.

4,989,237

IMAGE DATA TRANSMISSION APPARATUS

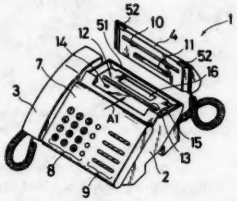
Matahira Kotani, Ikoma; Masafumi Matsumoto, Takaichi; Junichiro Matsumoto, Osaka; Motohiko Hayashi, Yamatokoriyama; Mamoru Fujii, Nara; Masafumi Yamanoue, Yao; Katsuyuki Sakai, Yamatokoriyama; Kouichi Mino, Higashikodaira; Naomitsu Murata, Nagoya; Hiroya Inagaki, Suginami, and Mitsunobu Kondo, Yokohama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 15, 1989, Ser. No. 323,870

Claims priority, application Japan, Mar. 15, 1988, 63-62664; Mar. 15, 1988, 63-35086[U]; Mar. 15, 1988, 63-35087[U]

Int. Cl.[5] H04N *1/04*

U.S. Cl. 379—100 **5 Claims**



5. An image data transmission apparatus for transmitting image data, read from an original by a reading unit, the reading unit being detachably connected to the transmission apparatus main body to enable it to read image data in an attached state when an original is conveyed through an inlet past the reading unit, or in a detached state, the apparatus comprising:

detachability means for engaging and disengaging the reading unit with the transmission apparatus main body so as to create the detachability of the reading unit, the engaging means including,

a notch located on a side of the reading unit closest to said inlet,

a guide receptable, located on a side of the reading unit furthest from said inlet,

latching means, located on the transmission apparatus main body, for engaging with the notch when the reading unit is in an attached state and for disengaging with the notch when the reading unit is in a detached state,

position guiding means, located on the transmission apparatus main body, for engaging with the guide receptable when the reading unit is in an attached state and for disengaging with the notch when the reading unit is in a detached state.

4,989,238

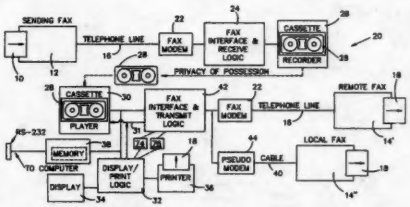
FACSIMILE RECORD AND PLAYBACK SYSTEM

Jerry R. Iggulden, Santa Clarita, and Donald A. Streck, Ojai, both of Calif., assignors to Light Ideas Incorporated, Woodland Hills, Calif.

Filed Feb. 21, 1989, Ser. No. 312,198

Int. Cl.[5] H04M *11/00*

U.S. Cl. 379—100 **43 Claims**



1. A system for receiving and recording facsimile transmissions from a telephone line on a removable recording medium for later display and viewing comprising:

(a) a cassette device containing a recording medium;

(b) recorder means for removably receiving said cassette device, for receiving data signals at an input thereof, and for writing said data signals on said recording medium;

(c) modem means connectable to the telephone line at an input thereof for receiving a facsimile transmission and for providing said facsimile transmission at an output thereof; and,

(d) first logic means connected to said output of said modem means for establishing a handshaking interface with a facsimile machine transmitting a facsimile on the telephone line, for receiving said facsimile transmission, for stripping off unnecessary transmission related information from document data information, for inserting control characters required for proper transcription at a later time, and for transmitting said control characters and document data information as data signals to said input of said recorder means, said first logic means including logic for performing the steps of,

(d1) outputting a start of message indicator to said input of said recorder means to be recorded on said cassette device whereby the start of each message on said cassette device can be found at a playback time,

(d2) when an incoming call from a sending facsimile machine is received, first staying in a loop to establish the necessary handshake interface with the sending machine,

(d3) when information from the sending machine begins to flow, looking to see if it has received document data related to the pixel content of a document being transmitted or interFAX communication data and if document data, proceeding to step (d4), otherwise to step (d5),

(d4) outputting document data to said input of said recorder means to be recorded on said cassette device and then proceeding to step (d9),

(d5) striping non-document data from a stream intended for recording on said cassette device,

(d6) determining whether an internal control character as employed by transcription logic should be inserted and if not, proceeding to step (d4),

(d7) providing appropriate control character(s) in said

stream intended for recording on said cassette device and proceeding to step (d4),

(d8) checking to see if the incoming transmission is finished and if not, returning to step (d3),

(d9) outputting an end of message indicator to said input of said recorder means to be recorded on said cassette device, and

(d10) terminating the interface with the sending facsimile machine in a normal manner and exiting.

4,989,239

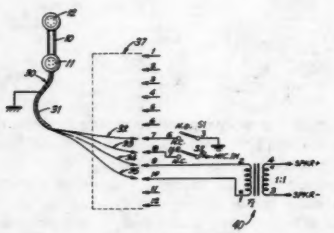
METHOD AND APPARATUS FOR PREVENTING PAY TELEPHONE FRAUD AND REDUCING HANDSET VANDALISM

Patrick J. McGarry, West Chester, Pa., assignor to Mars Incorporated, McLean, Va.

Filed Sep. 15, 1989, Ser. No. 407,899

Int. Cl.[5] H04M *17/02*

U.S. Cl. 379—145 **18 Claims**



1. An improved coin operated telephone having a handset microphone which is connected to a main body by first and second wires which are protected by a conductive protective plating which is connected to earth ground, wherein said telephone comprises:

a first selectively controllable switch connected between the first microphone connecting wire and system ground, said first switch connecting the microphone to ground when closed;

a second selectively controllable switch connected between the second microphone connecting wire and a signal input, said second switch connecting the microphone to the signal input when closed; and

means for selectively opening and closing the first and second selectively controllable switches upon detection of loss of loop current to connect and disconnect the microphone as desired.

4,989,240

TELEPHONE

Chihiro Fuse, Hirakata, and Yutaka Morita, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Jul. 10, 1989, Ser. No. 377,380

Claims priority, application Japan, Jul. 11, 1988, 63-91825; Sep. 20, 1988, 63-122919

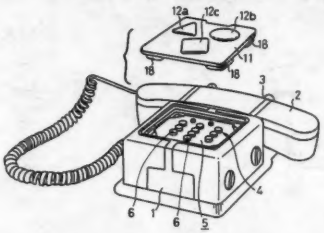
Int. Cl.[5] H04M *1/26*

U.S. Cl. 379—355 **9 Claims**

1. A telephone having a plurality of standard dialing push buttons arranged on an operation panel on a body of the telephone for entering telephone numbers, the telephone body being internally provided with a memory for prestoring therein at least one telephone number of at least one subscriber to be called and with a dial signal circuit for retrieving telephone number data from the memory in response to an input signal for placing a call to a desired subscriber and transmitting the data to telephone lines upon conversion to dial signals, the telephone comprising:

a closure for removably covering the surface of the operation panel on the telephone body;

at least one automatic dialing push button respectively arranged on the surface of the closure, wherein data representing at least one telephone number is storable in the memory in corresponding relation to the automatic dialing push button, and wherein the telephone body includes means for detecting depression of the automatic dialing



push button with the covering of the telephone panel with the closure in a closed state and feeding a detection signal to the dial signal circuit for the circuit to transmit to the telephone lines the telephone number data corresponding to the depressed automatic dialing push button and in the form of dial signals.

4,989,241

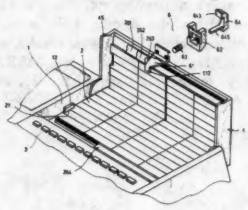
MEMORY DIAL TELEPHONE FINDER

Stanley Chen, No. 37, Lane 149, Nankang Rd., Sec. 3, Taipai, Taiwan

Filed Jun. 15, 1989, Ser. No. 366,718

Int. Cl.[5] H04M *1/00*

U.S. Cl. 379—357 **1 Claim**



1. A. memory dial telephone finer including a casing integrally made on the main frame of a microprocessor controlled telephone system said system including a keyboard operably coupled to the Y-axis matrix of the mainframe memory; a plurality of telephone number index cards having stepped edges set in said casing; a plurality of memory keys operably connected to the X-axis matrix of the mainframe memory; a cover pivotally mounted on said casing; a stop plate pivotally mounted on said casing; and a snapper slidably mounted on said cover said cover defining a rail along an inner side and said snapper being slidably mounted on the rail, and a plurality of locating holes along the inner side of the rail for alternately positioning said snapper having a press key and a hook extending into the stepped edges of said cards; said keypad; said keypad having number keys of O through 9 and the memory keys being operated by a press key on said snapper said snapper mounted a positioning plate mounted thereon said positioning plate extending from the top of said cover and said hook means depending from said cover, said press key being movably set in said positioning plate to selectively press memory keys and a return spring coupling said press key and said positioning plate; an expansion spring mounted on the casing and coupled to the cover; retaining means normally retaining said cover against said casing in a closed position and for releasing said cover

responsive to depression of said press key whereby said cover is released and said snapper hooks the required number index cards for identification and operates the selected memory key to turn on the memory matrix axis and the telephone identification can be entered on the Y-axis at the keypad.

4,989,242

CONTROL DEVICE FOR A HAND-FREE ALTERNATE OPERATING TELEPHONE SET

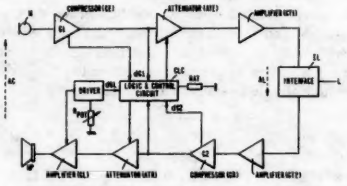
Thierry Arnaud, Meylan, France, assignor to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Dec. 27, 1989, Ser. No. 457,897

Claims priority, application France, Dec. 28, 1988, 88 17578

Int. Cl.[5] H04M *1/60*

U.S. Cl. 379—390 6 Claims



1. A hands-free telephone set connectable to a telephone line for receiving a distant audio signal transmitted on said telephone line to said hands-free telephone set and transmitting a local audio signal to said telephone line, said hands-free telephone set comprising:

an emission channel for receiving, at a sound sensor thereof, an acoustic signal, converting said acoustic signal to a corresponding electrical audio signal, and transmitting from an output said audio signal onto said telephone line, said emission channel including a microphone for detecting said acoustic signal and converting said acoustic signal to a corresponding electrical local audio signal, an emission compressor having a first controllable gain and receiving said local audio signal and controlling a level of said local audio signal to a constant average level to supply a compressed local audio signal, and an attenuator receiving said compressed local audio signal and, in response to a first gain control signal, controlling a level of said compressed local audio signal to supply a level controlled compressed local audio signal to said telephone line, and

a reception channel for receiving at an input thereof said distant audio signal from said telephone line and providing at an output transducer an acoustic output, said reception signal channel including a reception compressor having a second controllable gain receiving said distant audio signal from said telephone line and setting a level of said received distant audio signal to a constant average level to generate a compressed distant audio signal, a second attenuator receiving said compressed distant audio signal and, in response to a second gain control signal, controlling a level of said compressed distant audio signal to generate a level controlled compressed distant audio signal, and a loudspeaker receiving said level controlled compressed distant audio signal and, in response, generating an acoustic output signal, said emission and reception channels forming an amplifying loop by an acoustic coupling provided between the microphone and loudspeaker in combination with an electric coupling formed between said emission and reception channels formed at said telephone line;

means for initially setting a gain of said loop to a predetermined value less than unity (0 db), and

gain controlling means for computing a sum of, and substantially maintaining constant a sum of the compressor gains and attenuator gains.

4,989,243

AUTOMATIC COMPENSATION SYSTEM OF TRANSMISSION LEVEL IN MODEM

Choon-Kun Choi, Sungnam, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea

Filed Dec. 30, 1988, Ser. No. 292,355

Claims priority, application Rep. of Korea, Oct. 14, 1988, 1988-13425

Int. Cl.[5] H04B *3/10*

U.S. Cl. 379—402 20 Claims

1. An automatic compensation system for controlling the transmitting signal level in a MODEM for use in a public telephone line, comprising:

first analog signal terminal means for receiving an analog input signal from a modulator of a MODEM;

second analog signal terminal means for supplying an analog output signal to a modulator of the MODEM;

transformer means having a first coil connectable to a public telephone line and a second coil coupled to the first coil, and providing impedance matching between said first and second coils, for transferring an analog signal from one coil to the other coil;

gain controller means for providing an intermediate signal by controlling the output gain of an analog signal received from said first analog signal terminal means in accordance with gain control data;

hybrid means coupled between said gain controller means, said second coil and said second analog signal terminal means, for amplifying the intermediate signal of said gain controller and then delivering a first amplified signal to the second coil to transmit to the telephone line, and for amplifying an output of said second coil received from the telephone line and then delivering a second amplified signal to said second analog signal terminal means;

band-pass filter means having first and second band-pass filters for providing a first output signal by respectively separately filtering a first band signal and a second band signal from said second analog signal terminal means;

amplifier means for providing a second output signal by amplifying the first output signal;

voltage converter means for rectifying the second output signal of said amplifier to provide a rectified output signal;

receiving level sensing means including therein a first and a second reference voltage node for each respectively receiving first and second reference voltages and each setting corresponding upper and lower limits on a received analog signal level, for providing a plurality of receiving information data by comparing the rectified output signal of said voltage converter means with said upper and lower limits, said receiving information data indicating the level of and initial control data.

4,989,244

DATA ENCRIPTING TRANSFER

Yoshihiro Naruse; Hideharu Kato, both of Ichikawa, and Yoshifumi Iwata, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Kabushiki Kaisha Shinsangyokaihatsu, Tokyo, both of, Japan

Filed Mar. 29, 1989, Ser. No. 330,382

Claims priority, application Japan, Mar. 29, 1988, 63-075586; Mar. 29, 1988, 63-075587

Int. Cl.[5] H04N 7/167

U.S. Cl. 380—20 9 Claims

1. A data encrypting transfer system comprising:

first transmitter/receiver means comprising first transmitting means for transmitting encrypted key data, encrypted image data and a flag signal, scanning means for scanning an object to output an image signal, a key circuit for setting key data, encrypting means for encrypting the key data, and for encrypting the image signal in accordance with the set key data; and

second transmitter/receiver means comprising receiver means for receiving the encrypted key data, the encrypted image data and the flag signal transmitted by said first transmitter means, decoder means for decoding the received encrypted key data, thereby providing decoded key data, and for decoding the encrypted image signal;

said second transmitter/receiver means further comprising means for encrypting the decoded key data, thereby providing answer back data, and second transmitter means for transmitting the answer back data to said first transmitter/receiver means; and

said first transmitter/receiver means further comprising decoding means for decoding the answer back data transmitted by said second transmitter means, comparing means for comparing the decoded answer back data with the key data set by said key circuit, means for setting the flag signal in accordance with whether the comparison indicates that the decoded answer back data is coincident with the key data set by said key circuit, and the decoder means of said second transmitter/receive means being set in accordance with the decoded key data only if the flag signal transmitted by said first transmitter means indicates coincidence between the decoded answer back data and the key data set by said key circuit so that the decoder means of said second transmitter/receiver means decodes the encrypted image signal in accordance with the decoded key data.

4,989,245

CONTROLLED AUTHORIZATION OF DESCRAMBLING OF SCRAMBLED PROGRAMS BROADCAST BETWEEN DIFFERENT JURISDICTIONS

Christopher J. Bennett, San Diego, Calif., assignor to General Instrument Corporation, New York, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,540

Int. Cl.[5] H04K 9/00

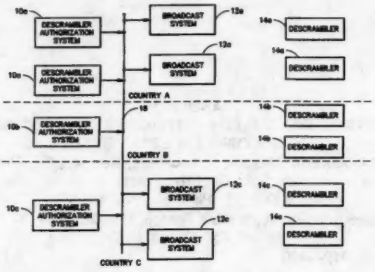
U.S. Cl. 380—23 8 Claims

1. A control system for controlling descrambling within a plurality of jurisdictions of a scrambled program broadcast from at least one of said jurisdictions, the system comprising

separate descrambler authorization systems for different jurisdictions for providing authorization signals indicating whether descrambling of a predetermined program by descramblers located within the respective jurisdiction of the descrambler authorization system is authorized;

means for distributing to a broadcast system the authorization signals pertaining to said predetermined program that are provided by the descrambler authorization systems for a plurality of said jurisdictions;

a broadcast system for broadcasting a scrambled predetermined program and the distributed authorization signals pertaining to said predetermined program that are provided by the descrambler authorization systems for a plurality of said jurisdictions; and



descramblers located in each jurisdiction for descrambling the scrambled predetermined program only when authorized by said broadcast authorization signals provided by the descrambler authorization system for the jurisdiction in which the descramblers are located.

4,989,246

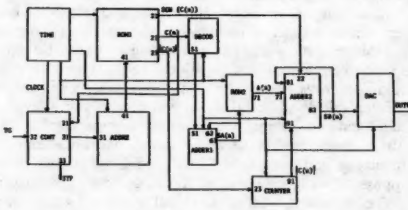
ADAPTIVE DIFFERENTIAL, PULSE CODE MODULATION SOUND GENERATOR

Shyue-Yun Wan, Hsin Chu; Shie-Ming Peng, Taur Yuan, and Der-Chwan Wu, Nan Tour, all of Taiwan, assignors to Industrial Technology Research Institute, R.O.C., Hsinchu, Taiwan

Filed Mar. 22, 1989, Ser. No. 326,993

Int. Cl.[5] G10L 5/00

U.S. Cl. 381—40 3 Claims



1. A storage and generation system for sound signal having silence and repetition periods, comprising

means for converting said sound signal into digital codes using adaptive differential pulse code modulation (ADPCM) technique,

means for storing in a memory said digital codes except said silence periods and repetition periods,

means for converting said stored digital codes into analog signal together with said silence period and repetition periods,

means for converting said ADPCM code in a read only memory based on different signal content,

said means for storing said ADPCM code and said means for converting said digital signals including:

(a) Oscillator for generating a basic clock pulse for whole said system,
(b) Timing generator for generating clocks for different functional blocks,
(c) Control circuit for controlling the start, repetition and end of said sound signal,
(d) ROM1 for storing said sound signal codes,
(e) Address Decoder for outputting decoded addresses from said ROM1,
(f) Data Decoder for decoding said digital codes from said ROM1,
(g) ROM2 for storing stepsize values,
(h) ADDER1 for adding or subtracting data from said decoder and outputting results to addresses of said ROM2,
(i) ADDER2 for adding or subtrating said size values,
(j) Data Code Counter for controlling said ADDER2 for continuous addition,
(k) DAC for transferring the signal from said ADDER2 to corresponding analog signal.

4,989,247

METHOD AND SYSTEM FOR DETERMINING THE VARIATION OF A SPEECH PARAMETER, FOR EXAMPLE THE PITCH, IN A SPEECH SIGNAL

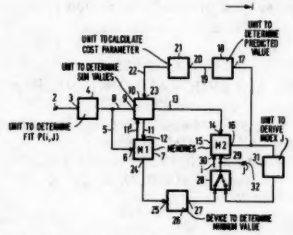
Jan P. Van Hemert, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 225,340, Jul. 28, 1988, abandoned. This application Jan. 25, 1990, Ser. No. 470,402

Claims priority, application Netherlands, Jul. 3, 1987, 8701798

Int. Cl.[5] G10L *7/02*

U.S. Cl. 381—41 **12 Claims**



1. A method of determining the variation of a speech parameter of a speech signal as a function of time comprising:

(i) in a first step

—deriving time segments of the speech signal at a number of time instants m which regularly follow each other,

—and from each time segment i ($1<i<m$) deriving a degree of fit p(i,j) associated with the time segment and which, for a series of n possible values for the speech parameter, indicates how well a chosen value f_j for the speech parameter ($1<j<n$) fits the speech signal of the time segment i,

(ii) in a second step

for the time instant i=1 and for each of the n possible values f_j for the speech parameter, storing in a memory a value ms(1,j) associated with said speech parameter, which value is equal to p(1,j),

(iii) in a third step

—for a certain time instant i(>1) and a certain possible value f_j for the speech parameter, deriving a number of summation values $s_h(i,j)$ in accordance with the formula $s_h(i,j) = p(i,j) + ms(i-1,h) + k(f_j(i), f_h{}^x(i))$ where h runs from x up to and including y and for x and y $1<x<j$, $j<y<n$ and $x \neq y$,

—and of all the $y-x+1$ summation values $s_h(i,j)$ an optimum summation value is stored in said memory as the value ms(i,j) and, in addition, a coupling vector v(i,j) which refers to the value $f_h(i-1)$ of the speech parameter at the time instant $i-1$, which, for the relevant index h, resulted, according to the above formula, in the optimum summation value, is stored in a memory,

(iv) repeating the third step for all of the other indices j at the time instant i,

(v) repeating the third step for all of the other indices j at a subsequent time instant $i+1$,

(vi) and wherein $k(f_j(i),f_h{}^x(i))$ is a cost parameter which is a measure of the deviation of the speech parameter $f_j(i)$ at the time instant i with respect to a predicted value $f_h{}^x(i)$ for the speech parameter at the time instant i, which predicted value is derived from at least the speech parameter value $f_h(i-1)$ at the time instant $i-1$, and is determined in accordance with the formula

$$f_h{}^x(i) = a_0 + a_1 f_h(i-1) + \sum_{z=2}^{r} a_z f_1(i-z)$$

where a_0, a_1 and a_z are constants with a_0 being less than zero and, if $r>2$, $f_1(i-z)$ is the value for the speech parameter at the time instant $i-z$, which value lies on a sub-path which, via the coupling vectors v(i,j), leads to the speech parameter $f_h(i-1)$ at the time instant $i-1$, and $a_1 \neq 0$.

4,989,248

SPEAKER-DEPENDENT CONNECTED SPEECH WORD RECOGNITION METHOD

Thomas B. Schalk, Dallas, and George R. Doddington, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 110,062, Oct. 13, 1987, Pat. No. 4,831,551, which is a continuation of Ser. No. 13,154, Feb. 10, 1987, abandoned, which is a continuation of Ser. No. 461,884, Jan. 28, 1983, abandoned. This application Mar. 3, 1989, Ser. No. 319,384

Int. Cl.[5] G10L *5/00*

U.S. Cl. 381—42 **11 Claims**

1. A method for recognizing speech comprising the steps of:

storing reference templates containing speech parameters corresponding to a plurality of portions of words in a predefined vocabulary and defining speech reference frames;

receiving speech inputs and transforming the speech inputs into a plurality of sample input speech frames of speech parameters of like type to those contained in said reference templates;

making a sliding comparison of an input speech frame sequence to a reference template sequence;

calculating error values indicating the distance between each input speech frame and each reference template sequence corresponding to a word;

tracking a scanning error over a predetermined time period;

determining when the scanning error has achieved a minimum error of all such comparisons of an input speech frame sequence with each of the reference template sequences corresponding to all of the words in the predefined vocabulary and thereafter increased by a predetermined amount;

identifying a local minimum based upon the achievement of a minimum scanning error and the increase therefrom of a predetermined amount; and

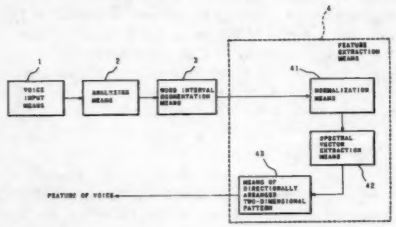
generating a word recognition hypothesis if the particular value of the accumulated scanning error causing the local minimum is below a certain threshold value.

4,989,249

METHOD OF FEATURE DETERMINATION AND EXTRACTION AND RECOGNITION OF VOICE AND APPARATUS THEREFORE

Ryu-ichi Oka, Tsukuba, and Hiroshi Matsumura, Kazo, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka and Agency of Industrial Science and Technology, Tokyo, both of, Japan

Filed May 20, 1988, Ser. No. 196,390
Claims priority, application Japan, May 29, 1987, 62-136377; Sep. 30, 1987, 62-248915
Int. Cl.[5] G10L 7/08
U.S. Cl. 381—43 42 Claims



30. A voice recognition apparatus in which a scalar time-space field pattern lattice plane having a abscissa and an ordinate with one being the time axis and the other the space axis is obtained from a voice signal inputted as a recognition object, and a voice characteristic pattern based upon said time-space pattern is to be matched with a standard pattern to recognize the inputted voice, the apparatus comprising:

means for analyzing the inputted voice signal to obtain said scalar time-space field pattern,

means for converting the scalar time-space field pattern into a vector field pattern lattice having each point corresponding to each lattice point of the scalar time-space field pattern lattice plane with each vector of the vector field pattern lattice having a quantity parameter and an angular orientation parameter,

means for forming N (wherein N is an integral number) two dimensional orientation pattern lattices each corresponding to one of N angular range groups of the vector angular orientation parameter into which the angular orientation parameters of the vectors of the vector field pattern within a corresponding angular range fall, the lattice point of each of said N two dimensional orientation pattern lattices having the vector quantity parameter of the point of the vector field pattern lattice whose angular orientation parameter corresponds to the angular orientation range of the two dimensional orientation pattern range, and

means for linearly matching a pattern derived from the N two-dimensional orientation pattern lattices as the voice characteristic pattern with said standard pattern.

4,989,250

SPEECH SYNTHESIZING APPARATUS AND METHOD

Mitsuo Fujimoto, Nara, and Toru Kitamura, Osaka, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

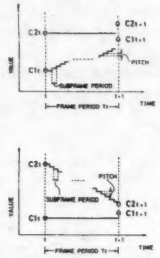
Filed Feb. 15, 1989, Ser. No. 311,074
Claims priority, application Japan, Feb. 19, 1988, 63-37965; Mar. 17, 1988, 63-64304
Int. Cl.[5] G10L 5/00
U.S. Cl. 381—51 14 Claims

1. A speech synthesizing apparatus, comprising:

division means for providing results by dividing a difference between present and target values for each of an adjacent two speech parameters of a synthesized voice by a predetermined number of subframe periods which together constitute a frame period, said present values being indicative respectively of values of each of said adjacent speech parameters at a beginning of the frame period, the target values being indicative respectively of values of each of said adjacent speech parameters at an end of the frame period;

means for determining interpolation pitches of said adjacent speech parameters based upon said results; and

means for interpolating the adjacent speech parameters during each of said subframe periods based on the interpolation pitches to produce interpolated speech parameters, said determining means determining said interpolation pitches so that whichever one of said adjacent speech parameters is greater than the other at said beginning of said frame period remains greater than the other at said end of said frame period; and



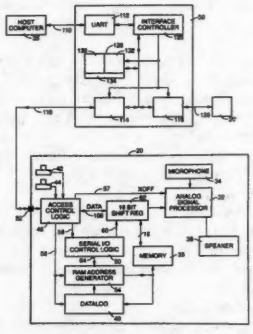
a synthesizing filter responsive to said interpolating means for filtering said interpolated speech parameters, said filter being thereby free of oscillation which would otherwise arise if said interpolation means, based on said interpolation pitches, caused whichever one of said adjacent speech parameters that was greater than the other at said beginning of said frame period to become less than the other at said end of said frame period.

4,989,251

HEARING AID PROGRAMMING INTERFACE AND METHOD

Stephan E. Mangold, Alingsas, Sweden, assignor to Diaphon Development AB, Molndal, Sweden

Filed May 10, 1988, Ser. No. 192,259
Int. Cl.[5] H04R 25/00, 29/00
U.S. Cl. 381—68.2 6 Claims



1. An auditory prosthesis, comprising:

programmable signal processing means for filtering and

amplifying auditory signals in accordance with a set of program data;

program loading means coupled to said signal processing means for loading a specified set of program data into said signal processing means; said program loading means including memory means for storing a plurality of distinct sets of program data, reprogramming means for loading sets of program data from an external source into said memory means, and means for loading one of said plurality of stored sets of program data into said signal processing means after said reprogramming means loads program data from an external source into said memory means; and

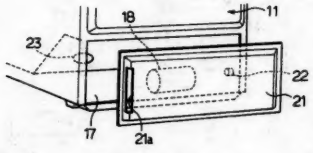
muting means coupled to said signal processing means for temporarily muting said signal processing means while said program loading means loads a set of program data into said signal processing means; said muting means coupled to said reprogramming means and including means for muting said signal processing means while said reprogramming means loads program data from an external source into said memory means and continuing to mute said signal processing means until a set of program data has been loaded into said signal processing means.

4,989,252

SILENCER

Keiji Nakanishi, Takatsuki, and Yasuyuki Sekiguchi, Ibaraki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 28, 1989, Ser. No. 413,559
Claims priority, application Japan, Sep. 30, 1988, 63-248467
Int. Cl.[5] H03B *29/00*
U.S. Cl. 381—71 **22 Claims**



1. A silencer for deadening sound from a sound source comprising:

a sound receiver receiving sound from said sound source to thereby generate an electrical signal in accordance with the received sound;

signal converting means for converting the electrical signal generated by said sound receiver to an electrical signal corresponding to sound interfering with the sound to be received by said sound receiver so that the sound from said sound source is deadened by the effect of sound wave interference;

sound producing means for producing sound in accordance with the electrical signal generated by said signal converting means; and

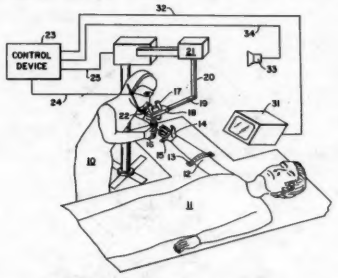
a compartment for enclosing said sound source, said sound receiver and said sound producing means, said compartment being defined by side, bottom, ceiling, front and rear walls so that one of the dimensions of said compartment in the directions of the length, height and width thereof is set at a value larger than a wavelength of the sound to be deadened and the other dimensions thereof are set at respective values smaller than the wavelength of the sound to be deadened such that a standing wave of the sound to be deadened is composed only in said one direction, said compartment having a ventilating opening formed in a predetermined position of at least one of the walls defining the same, said ventilating opening being formed in a generally slender rectangular shape, a direction of a length of the ventilating opening intersecting perpendicularly the direction in which the standing wave of the sound travels in the compartment.

4,989,253

VOICE ACTIVATED MICROSCOPE

Marc D. Liang; Krishna Narayanan, both of Pittsburgh, and John L. Kurtz, Indiana, all of Pa., assignors to The Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.

Filed Apr. 15, 1988, Ser. No. 182,225
Int. Cl.[5] H03G *3/20*
U.S. Cl. 381—110 **10 Claims**



1. In an optical microscope having supporting structure and motor operated first means to position said supporting structure at selected locations, the improvement comprising:

sound detection means for converting acoustic energy into audio-electrical signals;

control means including:

isolated-word recognition means for identifying pre-established word commands from said audio-electrical signals and for generating corresponding identified electrical signals;

computer means for generating operating electrical signals corresponding to said identified electrical signals;

output signal generator means, responsive to said operating electrical signals to deliver actuating electrical signals to said motor operated first means to actuate said motor operated first means;

whereby word commands corresponding to said pre-established word commands, applied to said sound detection means will result in pre-established movements of said supporting structure.

4,989,254

ELECTRO-ACOUSTIC TRANSDUCER AND MANUFACTURING PROCESS

Leonard D. Amalaha, 6202 44th Ave., Riverdale, Md. 20737

Filed Jun. 30, 1989, Ser. No. 373,258
Int. Cl.[5] H04R *7/00*
U.S. Cl. 381—202 **7 Claims**

1. An electro-acoustic transducer which can produce sound in substantially an omnidirectional capacity comprising:

a spherical diaphragm having two oppositely disposed openings;

said spherical diaphragm having upper and lower hemispherical portions, each said hemispherical portion having a peripheral edge flange extending inwardly around the periphery of said hemispherical portion at the equatorial diameter, said hemispherical portions connecting at the equatorial diameter by said inwardly extending peripheral edge flanges;

at least one drive cone disposed within and rigidly connected to said spherical diaphragm over at least one of said openings in said spherical diaphragm;

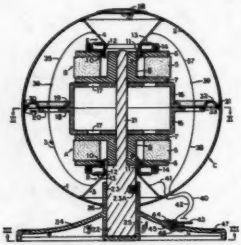
at least one actuation assembly including a voice coil disposed within said spherical diaphragm, each said at least

one actuation assembly connected to each said at least one drive cone, each said actuation assembly also connected to a magnetic assembly, said magnetic assembly having a central gap within which said voice coil is disposed;

spider suspension means connecting each said drive cone to an outer pole piece attached to each said magnetic assembly;

a carrier assembly to which at least one magnetic assembly is attached, said carrier assembly having an outer carrier edge flange;

a resilient circular surround having an outer resilient surround edge flange disposed between and bonded to said inwardly extending peripheral edge flanges of said hemispherical portions, said resilient circular surround having



an inner resilient surround edge flange attached to said carrier assembly edge flange;

a support pole disposed through said spherical diaphragm and at least one inner pole piece attached to each said magnetic assembly and supporting said spherical diaphragm, magnetic assembly and said carrier means;

a base plate assembly from which said support pole vertically extends, said base plate disposed beneath said spherical diaphragm and having a concave slope extending radially outward from said support pole, said base plate acting as a wave guide; whereby

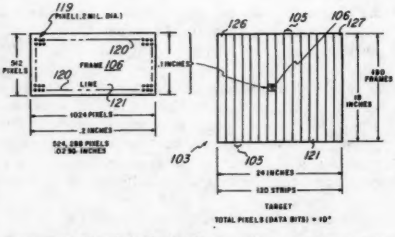
said voice coil, drive cone, magnetic assembly and said actuation assembly serve to drive said spherical diaphragm to produce sound in an omnidirectional manner.

4,989,255

EXPANSION OF COMPACT DATABASE FOR PATTERN INSPECTOR OR WRITER

William G. Manns; Anthony B. Wood, both of Dallas; David A. Norwood, Richardson, and Theodore R. Bambenek, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 25, 1988, Ser. No. 173,710
Int. Cl.[5] G06K *9/00, 9/36, 9/46*
U.S. Cl. 382—8 **6 Claims**



1. A computerized method of expanding a compact database representation of an ideal pattern, to a bit-mapped representation of the ideal pattern, in a optical, pattern writing or inspection system, comprising the steps of:

(a) partitioning an ideal pattern and a target pattern into a plurality of strips;

(b) partitioning each strip of said ideal pattern and said target pattern into a plurality of data frames and target frames respectively;

(c) partitioning the ideal pattern into a plurality of polygons each of which is completely contained within a single data frame; and

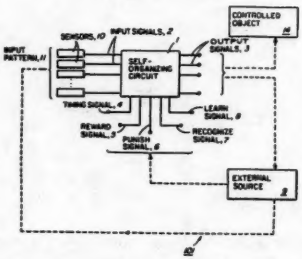
(d) organizing the compact database to include a data frame for each corresponding target frame so that each polygon be described completely within the data frame that corresponds to the target frame.

4,989,256

SELF-ORGANIZING CIRCUITS

Bruce S. Buckley, 7067 Via Blanca, San Jose, Calif. 95139

Continuation-in-part of Ser. No. 911,144, Sep. 24, 1986, Pat. No. 4,774,677, and a continuation-in-part of Ser. No. 202,045, Jun. 3, 1988, abandoned. This application Jul. 6, 1988, Ser. No. 215,583
Int. Cl.[5] G06K *9/62*
U.S. Cl. 382—15 **50 Claims**



1. A system that comprises:

transducer means to sense an input thereto and operable to provide a first output signal representative of said input;

self-organizing circuit means connected to receive said first output signal and operable to effect analysis of constituent elements of said input and provide a further output signal related to said input, each self-organizing circuit of said self-organizing circuit means including a plurality of sub-circuits or levels which are connected to receive messages from some other sub-circuit or level and are operable to deliver messages to some other sub-circuit or level, there being voting in that each sub-circuit or level weights relative amounts of negative and positive influence thereto and votes whether or not to pass along information to the further sub-circuits or levels; and

error correcting means acting on each subcircuit or level of the self-organizing circuit means which serves to correct errors in said further output signal by modifying the strength of the connections between said sub-circuits or levels occasioned by inaccurate analysis of the input by the self-organizing circuit means, and for effecting analysis of a first pattern of constituent elements and at a later time to apply said error correcting means to effect analysis of a second pattern of constituent elements without modifying the strength of at least a portion of said connections made during said first application of error correcting means.

4,989,257

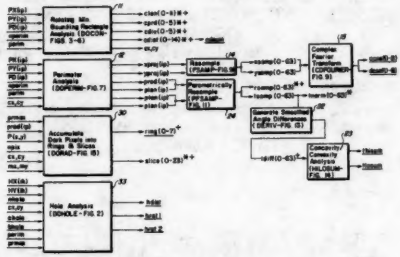
METHOD AND APPARATUS FOR GENERATING SIZE AND ORIENTATION INVARIANT SHAPE FEATURES

Steven L. Horowitz, Piedmont, Calif., assignor to GTX Corporation, Phoenix, Ariz.

Division of Ser. No. 26,672, Mar. 13, 1987, Pat. No. 4,802,230. This application Jan. 30, 1989, Ser. No. 304,785

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—18 **10 Claims**



1. A method of operating a computer to extract features of a character that has been electronically scanned to produce pixel data, the method comprising the steps of:

(a) generating a plurality of hypothetical contiguous ring regions surrounding the character, and producing a plurality of ring variables corresponding to the respective ring regions;

(b) determining the number of dark pixels of characters that lie within each ring region and setting a corresponding ring variable to that number; and

(c) eliminating size information from each ring variable.

4,989,258

CHARACTER RECOGNITION APPARATUS

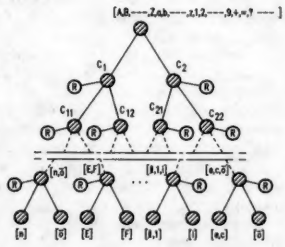
Hiroyasu Takahashi, Yokohama, and Akio Yamashita, Musashino, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1988, Ser. No. 239,110

Claims priority, application Japan, Sep. 9, 1987, 62-224233

Int. Cl.[5] G06K 9/68

U.S. Cl. 382—37 **14 Claims**



1. A character recognition apparatus wherein one or more character category candidates for an unknown character pattern are automatically determined through a search in a dictionary depending on multivalued features extracted from said pattern, comprising:

a tree-structured dictionary further comprising:

nonterminal nodes, each having an assigned multivalued feature and a corresponding threshold value, at least one of said nonterminal nodes having a corresponding limit value;

character category terminal nodes corresponding to at least one character category; and

at least one reject terminal node which causes termination of said search; and

means, at each nonterminal node responsive to the value of the assigned multivalued feature extracted from said unknown character pattern and corresponding limit and threshold values, for branching to the corresponding successor node, so that the branch will be made to the successor reject node if a limit value has been assigned to the nonterminal node and the value of the assigned multivalued feature is outside of the limit, and otherwise the branch will be made to the successor node based on the comparison of the value and the threshold value.

4,989,259

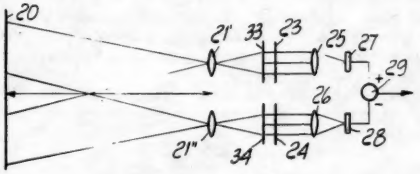
OPTICAL CORRELATOR FOR INCOHERENT LIGHT IMAGES

Antonio Pedotti, Brenta, and Giancarlo Ferrigno, Milan, both of Italy, assignors to Fondazione Projuventute Don Carlo Gnocchi, Milan, Italy

Continuation of Ser. No. 30,803, Mar. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 647,307, Sep. 4, 1984, abandoned. This application Jan. 22, 1990, Ser. No. 465,656

Int. Cl.[5] G06K 9/64

U.S. Cl. 382—42 **2 Claims**



1. An optical correlator, for use in real time image processing systems to recognize objects having selected shapes and sizes and to determine their coordinates, comprising:

(1) an extended source of incoherent light,

(2) objective lens means for focussing an image to be processed, and whereon the light of said extended source is caused to impinge,

(3) means for splitting the light of said extended source emerging from said objective lens means into two optical paths.

(4) a pair of groung glass carriers, each located in one of said optical paths at its focal plane to receive one of the focussed images,

(5) a pair of transparencies, each located behind said ground glass image carriers in the optical path,

(6) a pair of lenses, each located behind each of said transparencies,

(7) a pair of image sensors each consisting of a matrix of sensing elements, each located behind one of said lenses on their focal plane, to provide electrical signals responsive to the position and intensity of the light passing through the transparencies and the ground glass image carriers, said electrical signals being proportional to the cross correlation between the light leaving each ground glass image carrier and the transmittance of the respective transparency, and

(8) a combining circuit adapted to receive the electrical signals from said pair of sensors and provide an output signal proportional to the difference of intensity pixel by pixel of the images received by said pair of sensors, said combining circuit being so designed as to provide either positive or negative values in said cross-correlation,

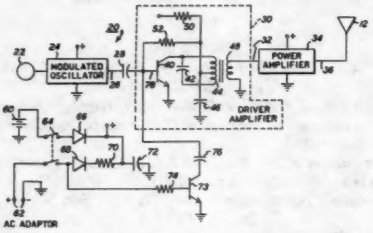
said combining circuit being adapted to combine pixel by pixel the outputs from said pair of sensors to supply at the output of said combining circuit an electrical signal corresponding to said cross correlation between said image and a predetermined function.

4,989,260

TRANSMITTER WITH POWER REDUCTION TO COMPENSATE FOR VARYING RADIATED ELECTRIC FIELD STRENGTH WHEN SWITCHING BETWEEN BATTERIES AND AC POWER

James P. Meade, Hamburg, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed May 17, 1989, Ser. No. 353,106
Int. Cl.[5] H04B *1/034*
U.S. Cl. 455—95 6 Claims



1. In a radio transmitter of the type that is powered in the alternative from an internal power source or an external power source connected to the transmitter by an electrical conductor, and in which radiation by said electrical conductor increases the strength of the signal broadcast by the transmitter when the transmitter is powered from the external power source, the improvement comprising:

means for reducing the power output of the transmitter when the transmitter is connected to the external power source.

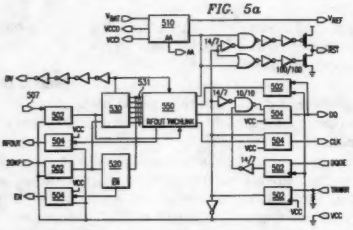
4,989,261

POWER SUPPLY INTERCEPT WITH REFERENCE OUTPUT

Robert D. Lee, Denton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Dec. 9, 1988, Ser. No. 283,426
Int. Cl.[5] H04B *1/034, 1/16*
U.S. Cl. 455—127 19 Claims

FIG. 5a



1. An electronic module, comprising:

a battery;

a first integrated circuit, connected

to receive both a primary power supply input and a secondary alternate power supply input, and also a ground voltage, and

to provide a first power supply voltage output, which is substantially equal to the more extreme of said primary and secondary power supply inputs, and

to provide data and control outputs, and

to provide a second power supply voltage output, which is significantly less extreme than said first supply voltage output when said first integrated circuit is driving a predetermined one of said control outputs toward the voltage level of said first power supply voltage; and

a second integrated circuit, connected

to receive said second supply voltage output from said first integrated circuit, and

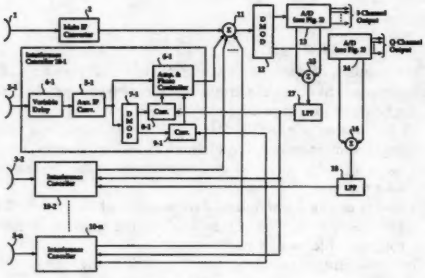
to receive said data and control outputs, and to be activated whenever said predetermined control output has a voltage greater than said reduced supply voltage.

4,989,262

DEMODULATOR WITH MULTIPLE INTERFERENCE CANCELLERS RESPONSIVE TO CORRELATIONS BETWEEN UNDESIRED SIGNALS AND ERROR SIGNALS

Masao Saito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,486
Claims priority, application Japan, Nov. 28, 1988, 63-300319; Nov. 28, 1988, 63-300320; Dec. 13, 1988, 63-315295
Int. Cl.[5] H04B *1/10*
U.S. Cl. 455—138 3 Claims



1. A demodulator comprising:

a main antenna having a main lobe for detecting a desired signal and sidelobes by which undesired signals may also be detected as interfering components;

a main frequency converter for translating the frequency of the output of said main antenna to an intermediate frequency;

summing means for summing the output of said main frequency converter with interference cancelling signals;

a main quadrature demodulator for decomposing the output of said summing means into a first main baseband component and a second main baseband component;

first decision means having multiple thresholds for making a decision on whether said first main baseband component exceeds each of said multiple thresholds, and producing a multibit code as a first channel output and a first error signal in accordance with said decision;

second decision means having multiple thresholds for making a decision on whether said second main baseband component exceeds each of the last-mentioned multiple thresholds, and producing a multibit code as a second channel output and a second error signal in accordance with the last-mentioned decision;

a plurality of auxiliary antennas for respectively detecting said undesired signals;

a plurality of auxiliary frequency converters for translating the frequency of the respective output of the auxiliary antennas to said intermediate frequency;

a plurality of auxiliary quadrature demodulators for respectively decomposing the output of each of said auxiliary frequency converters into first and second auxiliary baseband components;

a plurality of pairs of first and second correlators, the first correlators respectively detecting correlations between said first auxiliary baseband components and said first error signal, and said second correlators respectively detecting correlations between said second auxiliary baseband components and said second error signal;

a plurality of amplitude and phase control means associated respectively with the first and second correlators of a respective one of said pairs for controlling the outputs of said auxiliary frequency converters in response to the outputs of the associated first and second correlators to generate said interference cancelling signals; and

a plurality of variable length delay lines associated respectively with said auxiliary antennas for introducing respective delays so that said interference cancelling signals and corresponding interfering components contained in the output of said main frequency converter are time-coincident at said summing means.

4,989,263

RADIO RECEIVER WITH AUTOMATIC MODE CHANGEOVER CIRCUIT

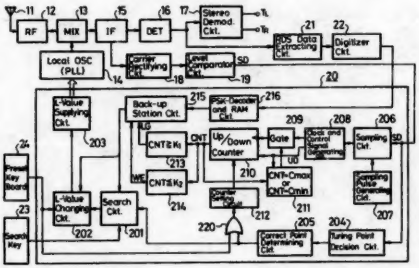
Mitsuhiro Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 19, 1988, Ser. No. 234,143

Claims priority, application Japan, Aug. 26, 1987, 62-211635

Int. Cl.[5] H04B *17/00*

U.S. Cl. 455—182 **7 Claims**



1. A receiver having an automatic mode change-over function, comprising:

means for generating a binary code signal indicative of the level of electric field intensity of a received radio wave;

sampling circuit means receiving said binary code signal for sampling same in response to a sampling pulse from a sampling pulse generating circuit;

up/down counter means;

means for detecting maximum and minimum count values in said up/down counter;

means for increasing a counted value in said up/down counter means by M (M is a positive integer) when said binary code signal is at one level and decreasing a counted value in said up/down counter means by N (N is a positive integer) when said binary code signal is at the other level;

gate circuit means responsive to said means for detecting for gating a signal from said means for increasing and decreasing to said up/down counter;

means for detecting whether a change-over operation is to be effected in accordance with the count value of said up/down counter means; and

means for setting said up/down counter at a midpoint between said maximum and minimum count values upon effecting a change-over operation.

4,989,264

BANDWIDTH LIMITING CIRCUIT WITH VARIABLE BANDWIDTH

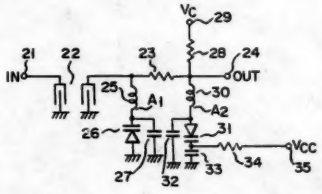
Hideki Ohto, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Sep. 27, 1988, Ser. No. 249,990

Claims priority, application Japan, Sep. 30, 1987, 62-246018

Int. Cl.[5] H04B *1/06*

U.S. Cl. 455—266 **15 Claims**



1. A bandwidth limiting circuit with a variable bandwidth comprising:

an input terminal for receiving an input signal whose bandwidth is to be limited;

an output terminal for outputting a bandwidth-limited output signal;

a control terminal for receiving a control voltage;

bandpass filter means with a fixed passing bandwidth connected between said input terminal and said output terminal for limiting the bandwidth of the input signal to output said bandwidth-limited signal;

first resonance circuit means connected to said bandpass filter means and said control terminal, for receiving the control voltage from said control terminal and trapping a first trapping frequency near the upper limiting frequency of the passing band of said bandpass filter means, said first trapping frequency varying in proportion to the control voltage; and

second resonance circuit means connected to said bandpass filter means and said control terminal for receiving the control voltage from said control terminal, and trapping a second trapping frequency near the lower limiting frequency of the passing band of the bandpass filter means the second trapping frequency varying reverse to the varying direction of said first resonance circuit means in proportion to the control voltage.

DESIGN PATENTS

GRANTED JAN. 29, 1991

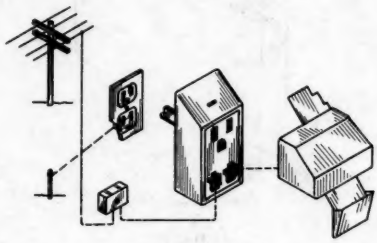
ERRATA

For CLASS	See PATENT NO.
D14-118	314,077

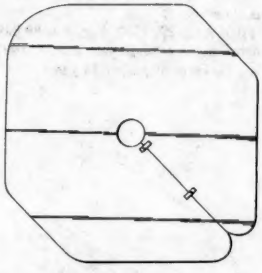
DESIGNS

JANUARY 29, 1991

314,077
SURGE PROTECTOR FOR A FACSIMILE MACHINE
Thomas W. Judd, and Edward L. Hames, both of Peterborough, N.H., assignors to Curtis Manufacturing Company, Inc., Jaffrey, N.H.
Filed Jan. 6, 1989, Ser. No. 294,499
Term of patent 14 years
U.S. Cl. D14—118



314,078
DISPOSABLE CAPE FOR USE IN MAMMOGRAPHIC EXAMINATIONS
Jane M. Wiederhold, Denison, Iowa; Faye A. Seggelink, Cleveland Heights, Ohio; Herbert J. Myers, Rock Hill, S.C.; Robert E. Daly, Davidson, N.C., and Jerry C. Cirino, Willoughby, Ohio, assignors to Picker International, Inc., Cleveland, Ohio
Filed Aug. 25, 1987, Ser. No. 89,247
Term of patent 14 years
U.S. Cl. D2—179

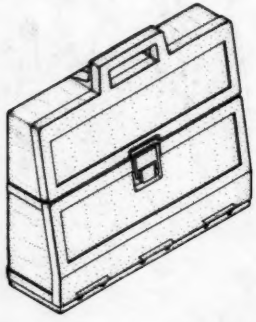


314,079
EYESTAY ELEMENT OF A SHOE UPPER
Michael A. Aveni, Lake Oswego, Oreg., assignor to Nike, Inc. and Nike International, Ltd., both of Beaverton, Oreg.
Filed Jun. 14, 1990, Ser. No. 537,763
Term of patent 14 years
U.S. Cl. D2—314

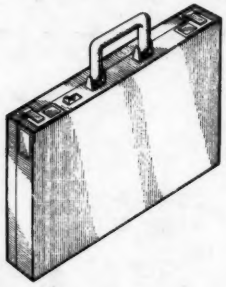
314,080
SCARF
Theresa Owens, 1412 Carroll St., Brooklyn, N.Y. 11213
Filed Nov. 30, 1989, Ser. No. 443,650
Term of patent 14 years
U.S. Cl. D2—500

314,081
BABY CARRIER SLING
Michael Lehman, 1133 Van Nuys St., San Diego, Calif. 92109
Filed Sep. 11, 1987, Ser. No. 95,245
Term of patent 14 years
U.S. Cl. D3—31

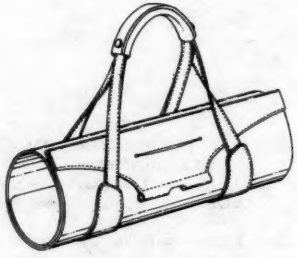
314,082
TOOL BOX
James W. Kime, 4895 Settles Pt., NW., Suwanee, Ga. 30174
Filed Jan. 30, 1989, Ser. No. 303,396
Term of patent 14 years
U.S. Cl. D3—73



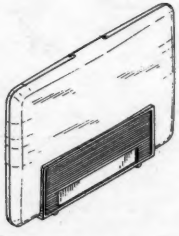
314,083
LIGHTED BRIEFCASE
William T. Hankinson, 328 Vandervoort St., North Tonawanda, N.Y. 14120, assignor to William T. Hankinson, N. Tonawanda, N.Y.
Filed Jul. 13, 1988, Ser. No. 218,600
Term of patent 14 years
U.S. Cl. D3—76



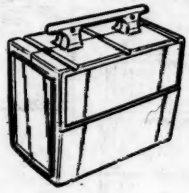
314,084
CARRYING CASE FOR DRAWINGS OR THE LIKE
Bardy Azadmard, 5955 W. 8th #111, Los Angeles, Calif. 90036
Filed Mar. 13, 1987, Ser. No. 25,838
Term of patent 14 years
U.S. Cl. D3—30.1



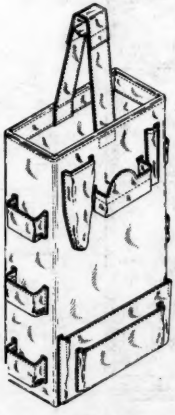
314,085
MAGNETIC CASSETTE TAPE CASE
Noboru Uemura, Odawara, Japan, assignor to TDK Corporation, Tokyo, Japan
Filed Aug. 27, 1987, Ser. No. 89,849
Claims priority, application Japan, Jan. 8, 1987, 62-332
Term of patent 14 years
U.S. Cl. D3—35



314,086
CASE
Fred A. Rogers, Hartland, and Aaron J. Fitzherbert, Springfield, both of Vt., assignors to Thermal Dynamics Corporation, West Lebanon, N.H.
Filed Jun. 22, 1987, Ser. No. 64,930
Term of patent 14 years
U.S. Cl. D3—73

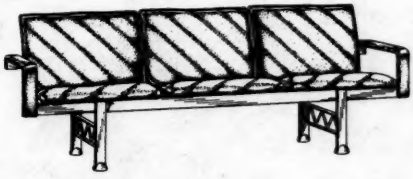


314,087
CADDY FOR GIFT WRAPPING OR THE LIKE
Ronald R. Macklin, 1841 Burr St., Fairfield, Conn. 06830
Filed May 21, 1990, Ser. No. 526,111
Term of patent 14 years
U.S. Cl. D3—99

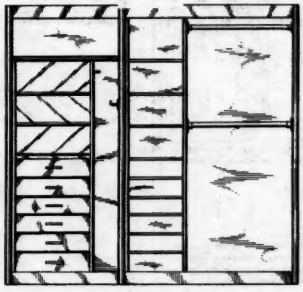


314,088
SEAT
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,474, Jan. 10, 1989. This application Jan. 26, 1990, Ser. No. 471,279
The portion of the term of this patent subsequent to Nov. 6, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—379

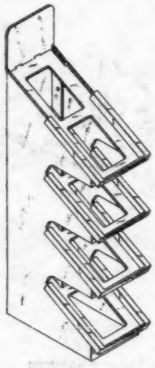
314,089
SEAT
Burkhard Vogtherr, Holzen-Kandern, Fed. Rep. of Germany, assignor to Klöber GmbH & Co., Fed. Rep. of Germany
Filed Sep. 11, 1987, Ser. No. 95,545
Term of patent 14 years
U.S. Cl. D6—381



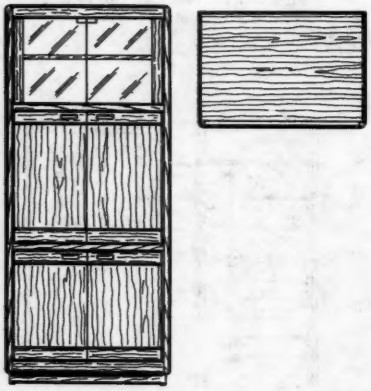
314,090
COMBINED STORAGE SHELF AND PLURAL DRAWER UNIT
William Stephens, Barto, Pa., and Mary J. Thompson, Reno, Nev., assignors to Faile Thompson Closets, Inc., Reno, Nev.
Filed Sep. 23, 1987, Ser. No. 100,075
Term of patent 14 years
U.S. Cl. D6—397



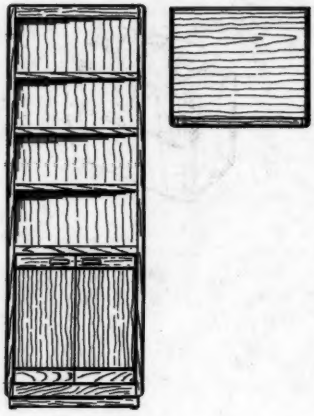
314,091
COLLAPSIBLE DISPLAY AND DISPENSER STAND
David March, New York, N.Y., assignor to Thomson-Leeds Company, Ltd., New York, N.Y.
Filed Aug. 24, 1987, Ser. No. 88,210
Term of patent 14 years
U.S. Cl. D6—408



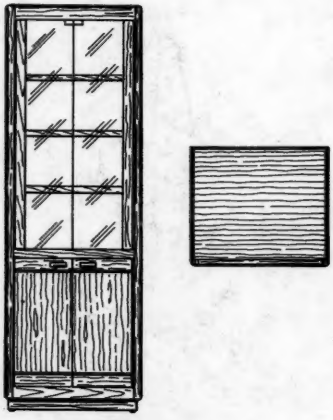
314,092
CABINET OR SIMILAR ARTICLE
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 26, 1988, Ser. No. 149,055
Term of patent 14 years
U.S. Cl. D6—436



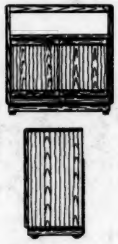
314,093
COMBINED CABINET AND SHELF UNIT
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 26, 1988, Ser. No. 149,061
Term of patent 14 years
U.S. Cl. D6—436



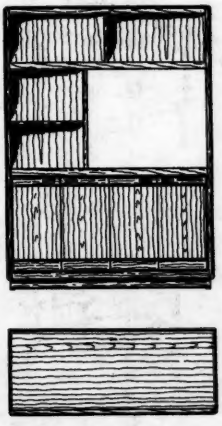
314,094
CABINET OR SIMILAR ARTICLE
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 26, 1988, Ser. No. 149,069
Term of patent 14 years
U.S. Cl. D6—436



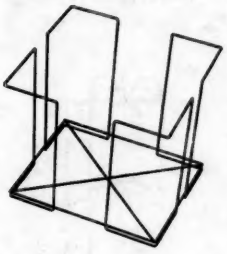
314,095
VIDEO CABINET OR SIMILAR ARTICLE
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 27, 1988, Ser. No. 149,201
Term of patent 14 years
U.S. Cl. D6—436



314,096
ENTERTAINMENT CENTER OR SIMILAR ARTICLE
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Jan. 28, 1988, Ser. No. 151,241
Term of patent 14 years
U.S. Cl. D6—436



314,097
NEWSPAPER BUNDLING RACK
Walter S. Buist, New Brunswick, N.J., assignor to Design Visions, Inc., Belle Mead, N.J.
Filed Dec. 30, 1987, Ser. No. 139,364
Term of patent 14 years
U.S. Cl. D6—458



314,098
MAGAZINE RACK
Peter M. Y. Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,474, Jan. 10, 1989. This application Jan. 26, 1990, Ser. No. 471,277
The portion of the term of this patent subsequent to Jan. 22, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—462

314,099
ETAGERE
Peter M. Y. Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,566, Jan. 10, 1989. This application Nov. 20, 1989, Ser. No. 428,656
The portion of the term of this patent subsequent to Feb. 27, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465

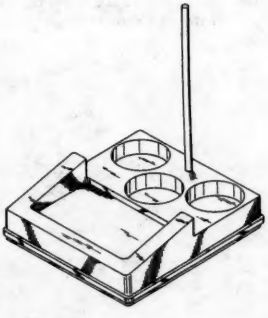
314,100
ETAGERE
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,474, Jan. 10, 1989. This application Jan. 26, 1990, Ser. No. 471,262
The portion of the term of this patent subsequent to Mar. 20, 2007, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465

314,101
BOOK SHELF UNIT
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,474, Jan. 10, 1989. This application Jan. 26, 1990, Ser. No. 471,356
The portion of the term of this patent subsequent to Aug. 14, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465

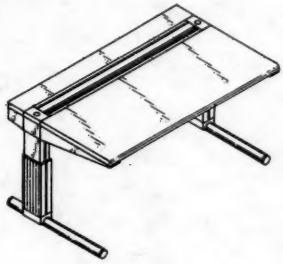
314,102
FURNITURE SUPPORT UNIT
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 371,028, Jun. 23, 1989. This application Jan. 26, 1990, Ser. No. 471,359
The portion of the term of this patent subsequent to Aug. 14, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465

314,103
SHELF UNIT
Peter M. Yau Kee, Happy Valley, Hong Kong, assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 295,474, Jan. 10, 1989. This application Jan. 26, 1990, Ser. No. 471,362
The portion of the term of this patent subsequent to Jun. 26, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—465

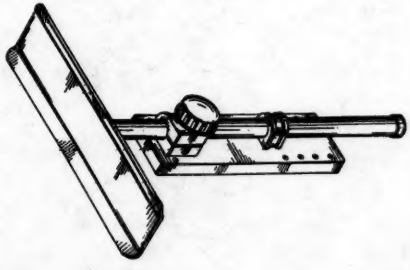
314,104
TABLETOP STAND FOR A PH METER
Ronald C. Johnson, Fullerton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.
Filed Sep. 16, 1987, Ser. No. 97,467
Term of patent 14 years
U.S. Cl. D6—467



314,105
TABLE
Sohrab Vossoughi, Portland, Oreg., assignor to Anthro Corporation, Portland, Oreg.
Filed Oct. 28, 1987, Ser. No. 116,116
Term of patent 14 years
U.S. Cl. D6—484

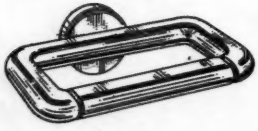


314,106
ADJUSTABLE ARMREST ATTACHMENT
Richard Szadkowski, Edmonds, Wash., assignor to Lucy Szadkowski, Lynnwood, Wash.
Continuation-in-part of Ser. No. 897,902, Aug. 19, 1986. This application Jan. 7, 1988, Ser. No. 142,878
Term of patent 14 years
U.S. Cl. D6—501

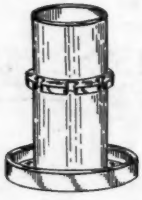


314,107
COMBINED PAPER HOLDER AND DISPENSER
Calven H. Lewis, and Sherrill D. Lewis, both of 3807 Arctic Fox Dr., Fort Collins, Colo. 80525
Filed Feb. 28, 1989, Ser. No. 316,438
Term of patent 14 years
U.S. Cl. D6—518

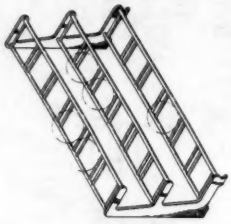
314,108
TOILET PAPER HOLDER WITH ROLLER
John P. Chap, Lemont, and Dorothy Greenberg, Oak Park, both of Ill., assignors to Selfix, Inc., Chicago, Ill.
Filed Aug. 12, 1988, Ser. No. 231,243
Term of patent 14 years
U.S. Cl. D6—523



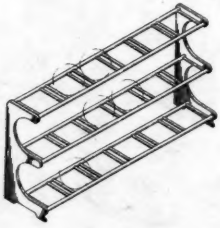
314,109
COMBINED TOOTHBRUSH AND TOOTHPASTE HOLDER
Patricia S. Jordan, 67 Sawyer St., Rochester, N.Y. 14619
Filed Sep. 2, 1988, Ser. No. 240,051
Term of patent 14 years
U.S. Cl. D6—528



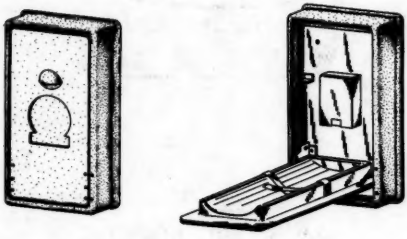
314,110
BALL RACK
Kiyomitsu Ohno, 2-9-9 Naka, Kunitachi, Tokyo 186, Japan
Filed Mar. 8, 1989, Ser. No. 320,780
Term of patent 14 years
U.S. Cl. D6—552



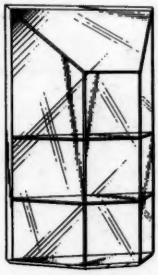
314,111
BALL RACK
Kiyomitsu Ohno, 2-9-9 Naka, Kunitachi, Toyko 186, Japan
Filed Mar. 8, 1989, Ser. No. 320,935
Claims priority, application Japan, Mar. 11, 1988, 63-9943
Term of patent 14 years
U.S. Cl. D6—552



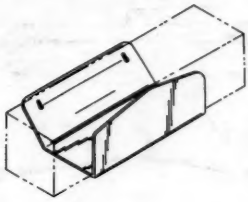
314,112
WALL MOUNTED DIAPER CHANGING STATION
Robert L. Dainty, Fridley, Minn., assignor to JBJ Industries, Inc., Vadnais Heights, Minn.
Filed Dec. 1, 1987, Ser. No. 127,091
Term of patent 14 years
U.S. Cl. D6—555



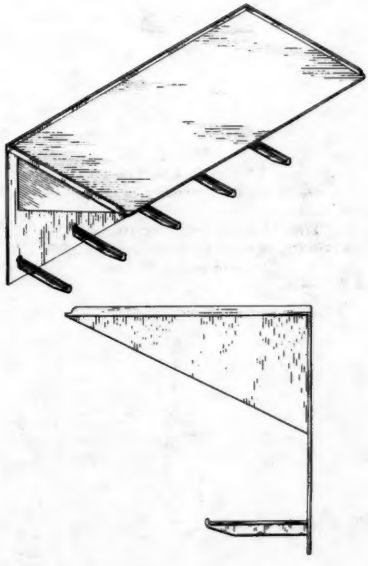
314,113
CURIO CABINET
Robert Hanfling, San Francisco, Calif., assignor to Magic Glass Corp., San Francisco, Calif.
Filed May 6, 1987, Ser. No. 47,251
Term of patent 14 years
U.S. Cl. D6—559



314,114
HOLDER FOR PACKAGED ROLLED WRAPPING FILM OR THE LIKE
Robert J. Steinman, 237 N. Main St., Edwardsville, Ill. 62025
Filed May 17, 1988, Ser. No. 194,726
Term of patent 14 years
U.S. Cl. D6—567



314,115
COMBINED SHELF AND HOOK UNIT
Kent D. Murphy, 6 Convent La., Skerries Co. Dublin, Ireland
Filed Feb. 21, 1989, Ser. No. 312,243
Term of patent 14 years
U.S. Cl. D6—574

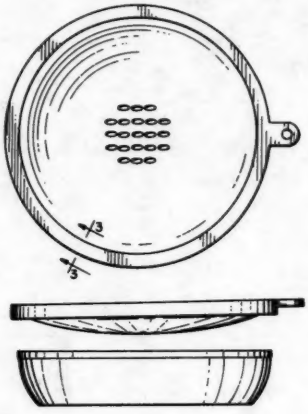


314,116
PILLOW
Margaret A. Reed, 752 B Avenida Estancia, Venice, Fla. 34292
Filed Oct. 1, 1987, Ser. No. 103,375
Term of patent 14 years
U.S. Cl. D6—601

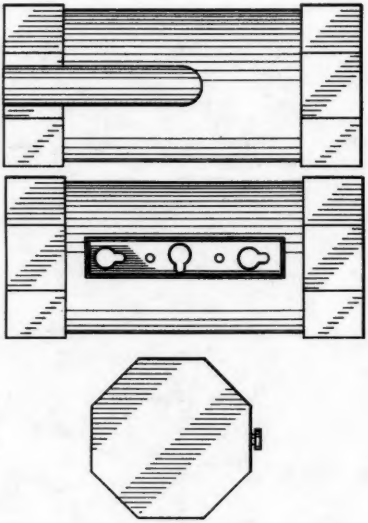
314,117
VACUUM BOTTLE
Tsunemichi Inoue, Osaka, Japan, assignor to Zojirushi Corporation, Osaka, Japan
Filed Sep. 13, 1988, Ser. No. 243,544
Claims priority, application Japan, Jun. 6, 1988, 63-22357
Term of patent 14 years
U.S. Cl. D7—321

314,118
KITCHEN LIGHTER
D. Javier Lloveras Capilla, Barcelona, Spain, assignor to Flamagas, SA, Spain
Filed Mar. 30, 1990, Ser. No. 503,174
Claims priority, application Spain, Oct. 10, 1989, 120137
Term of patent 14 years
U.S. Cl. D7—416

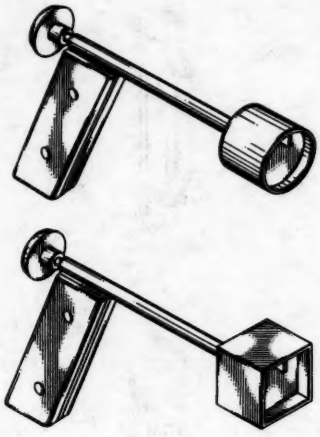
314,119
WATERMELON PLATE
Sharon L. Kauffman, 4141 Stevenson Blvd., #203, Fremont, Calif. 94538
Filed Mar. 28, 1988, Ser. No. 174,013
Term of patent 14 years
U.S. Cl. D7—505



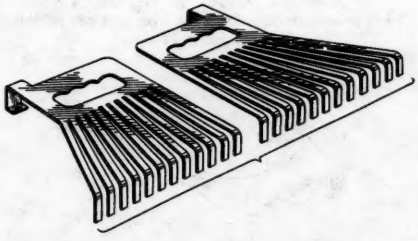
314,120
VACUUM BOTTLE CADDY
Charles A. Rankin, 185 Nocona Dr., Nocona, Tex. 76255
Filed Oct. 7, 1988, Ser. No. 254,788
Term of patent 14 years
U.S. Cl. D7—605



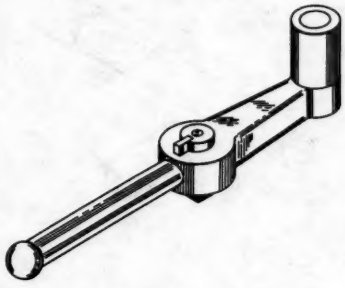
314,121
ICE CREAM DISPENSING DEVICE OR SIMILAR ARTICLE
Kelley O. Adams, 405 E. Carson Dr., Tempe, Ariz. 85282
Division of Ser. No. 126,293, Nov. 27, 1987, Pat. No. D. 309,699.
This application Jan. 16, 1990, Ser. No. 465,005
Term of patent 14 years
U.S. Cl. D7—681



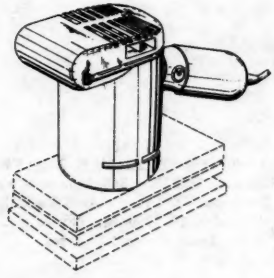
314,122
PAIR OF HAND RAKES
Loren L. Licht, 6255 Veemac Ave., La Mesa, Calif. 92041
Filed Jun. 17, 1988, Ser. No. 208,125
Term of patent 14 years
U.S. Cl. D8—13



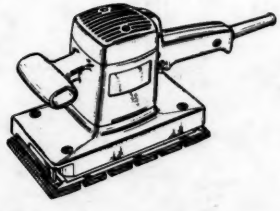
314,123
RATCHET WRENCH
Larry A. Brainard, 1836 4th St., Cuyahoga Falls, Ohio 44221
Filed Oct. 24, 1988, Ser. No. 261,278
Term of patent 14 years
U.S. Cl. D8—25



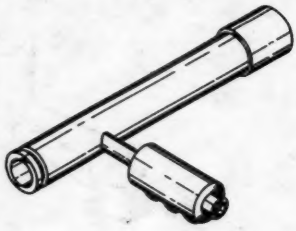
314,124
MOTOR HOUSING AND HANDLE FOR A PORTABLE POWER SANDER
Meyric K. Rogers, and Whitney C. Harkleroad, both of Lancaster, Pa., assignors to Ryobi Motor Products Corp., Pickens, S.C.
Filed Dec. 2, 1987, Ser. No. 128,540
Term of patent 14 years
U.S. Cl. D8—62



314,125
ORBITAL SANDER
Yasunori Ogawa, Mito; Kazumi Takeishi, and Junji Nakagawa, both of Katsuta, all of Japan, assignors to Hitachi Koki Company, Ltd., Japan
Filed Aug. 9, 1988, Ser. No. 230,346
Term of patent 14 years
U.S. Cl. D8—62



314,126
AIR POWERED AUTOMOBILE BODY DENT PULLER
Donald H. Moore, 6422 Tiebor, Passadena, Tex. 77505
Filed Nov. 17, 1986, Ser. No. 931,155
Term of patent 14 years
U.S. Cl. D8—67

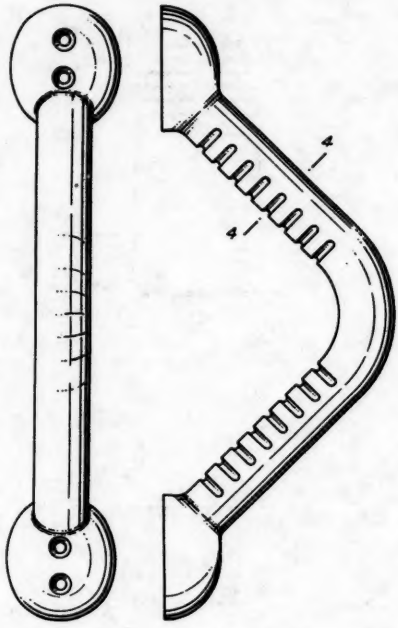


314,127
HAND-POWERED NAIL DRIVER
Fred W. Williamson, P.O. Box 866, Columbia, Va. 23038, and James L. Buchanan, 723 Grandin Ave., Rockville, Md. 20850
Filed Jan. 19, 1990, Ser. No. 467,215
Term of patent 14 years
U.S. Cl. D8—69

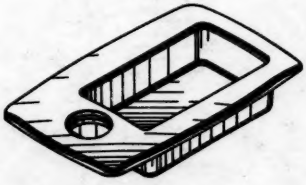
314,128
ENTRY HANDLE
Thomas J. Ryan, Del Mar, Calif., assignor to Masco Building Products Corp., Taylor, Mich.
Filed Oct. 3, 1988, Ser. No. 252,715
Term of patent 14 years
U.S. Cl. D8—302

314,129
DOOR HANDLE
Marco Zanini, Milan, Italy, assignor to Scottsass Associati S.r.l., Italy
Filed Aug. 11, 1988, Ser. No. 231,174
Claims priority, application Italy, Mar. 4, 1988, 20796B/88
Term of patent 14 years
U.S. Cl. D8—301

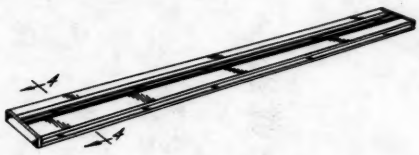
314,130
GRAB HANDLE
Peter K. C. Lee, Kowloon, Hong Kong, assignor to Hip Shing Fat Company Limited, Kowloon, Hong Kong
Filed Aug. 1, 1988, Ser. No. 226,846
Claims priority, application United Kingdom, Feb. 3, 1988, 1048228
Term of patent 14 years
U.S. Cl. D8—317



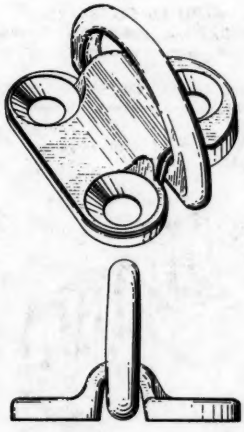
314,131
HOUSINGS FOR LATCHES AND LOCKS
Richard H. Russell, Farmington; David W. Kaiser, North Haven, and Richard M. O'Grady, Southington, all of Conn., assignors to The Eastern Company, Cleveland, Ohio
Division of Ser. No. 72,282, Jul. 10, 1987, Pat. No. 303,922. This application Jul. 24, 1989, Ser. No. 383,983
Term of patent 14 years
U.S. Cl. D8—321



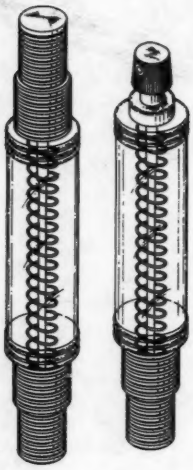
314,132
BRACKET WITH BRIGHT METALLIC INSERT FOR SUPPORTING A WINDOW COVERING
Jeffrey W. Goodell, 12375 Mount Jefferson Ter. Apt. #10-G, Lake Oswego, Oreg. 97035
Filed Apr. 18, 1988, Ser. No. 182,769
Term of patent 14 years
U.S. Cl. D8—377



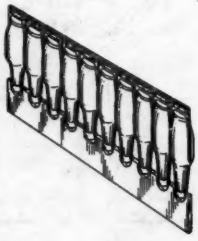
314,133
MULTIPLE PURPOSE PADEYE OR SIMILAR SECURED RING ARTICLE
Gerard Issard, Thiers, France, assignor to Wichard, Thiers, France
Filed Sep. 7, 1988, Ser. No. 241,204
Claims priority, application World Int. Prop. O., Mar. 17, 1988, DM/010 533
Term of patent 14 years
U.S. Cl. D8—367



314,134
SPRAY BOTTLE
Garfield Litton, Glen Rock, N.J., and Wolfgang Kuhl, New York, N.Y., assignors to Revlon, Inc., New York, N.Y.
Filed Jun. 13, 1989, Ser. No. 365,646
Term of patent 14 years
U.S. Cl. D9—300



314,135
STRIP OF CONTAINERS
Robert E. Newell, Pinner, and Michael D. Wilks, Aldershot, both of England, assignors to Glaxo Group Limited, London, England
Filed Dec. 12, 1988, Ser. No. 288,723
Claims priority, application United Kingdom, Jun. 23, 1988, 1051745
Term of patent 14 years
U.S. Cl. D9—344



314,136
SERVING BOTTLE
Jean Malvoisin, Hurigny, France, assignor to Etablissements, V.J.F., France
Filed Jun. 11, 1987, Ser. No. 60,425
Claims priority, application France, Dec. 12, 1986, 86 6600
Term of patent 14 years
U.S. Cl. D9—351

314,137
BOTTLE
Jean Malvoisin, Hurigny, France, assignor to Etablissements V.J.F., France
Filed Jun. 11, 1987, Ser. No. 60,426
Claims priority, application France, Dec. 12, 1986, 86 6602
Term of patent 14 years
U.S. Cl. D9—351

314,138
BOTTLE
Jean Malvoisin, Hurigny, France, assignor to Etablissements V.J.F., France
Filed Jun. 11, 1987, Ser. No. 60,427
Claims priority, application France, Dec. 12, 1986, 86 6603
Term of patent 14 years
U.S. Cl. D9—351

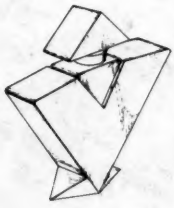
314,139
CONTAINER
Emilio Ambasz, 295 Central Park W., New York, N.Y. 10024
Filed Nov. 1, 1988, Ser. No. 265,667
Term of patent 14 years
U.S. Cl. D9—375

314,140
BOTTLE
Joseph M. Kornick, Chicago, and Dean R. Lindsay, Winnetka, both of Ill., assignors to The Coca-Cola Company, Atlanta, Ga.
Filed Jun. 6, 1988, Ser. No. 202,922
Term of patent 14 years
U.S. Cl. D9—376

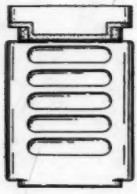
314,141
COMBINED BOTTLE AND CLOSURE
Joseph M. Kornick, Chicago, and Dean R. Lindsay, Winnetka, both of Ill., assignors to The Coca-Cola Company, Atlanta, Ga.
Filed Jun. 6, 1988, Ser. No. 202,437
Term of patent 14 years
U.S. Cl. D9—376

314,142
BOTTLE
Milton Briggs, York, Pa., assignor to Graham Engineering Corporation, York, Pa.
Filed Apr. 21, 1988, Ser. No. 184,483
Term of patent 14 years
U.S. Cl. D9—378

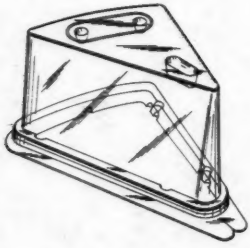
314,143
COMBINED BOTTLE AND CLOSURE
Pierre Dinand, Levallois, France, assignor to Guess?, Inc., Los Angeles, Calif.
Filed Nov. 16, 1987, Ser. No. 121,708
Term of patent 14 years
U.S. Cl. D9—384



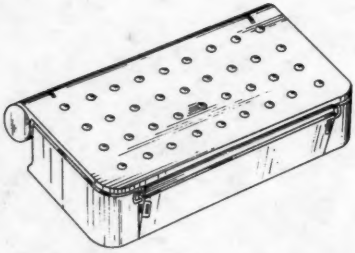
314,144
COMBINED PERFUME BOTTLE AND CLOSURE
Andre Ricard, Barcelona, Spain, assignor to Paco Rabanne Parfums, S.A., Neuilly sur Seine Cedex, France
Filed Oct. 27, 1988, Ser. No. 263,323
Claims priority, application France, Apr. 29, 1988, DM/010854
Term of patent 14 years
U.S. Cl. D9—384



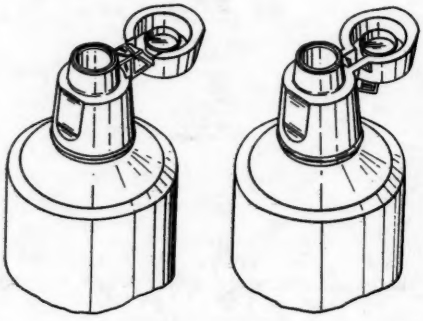
314,145
CONTAINER FOR TORTE OR THE LIKE
Walter Niemetz, 5322 Hoff, Gitzen 57, Austria
Filed Dec. 22, 1987, Ser. No. 136,321
Claims priority, application Austria, Jun. 22, 1987, 18551
Term of patent 14 years
U.S. Cl. D9—418



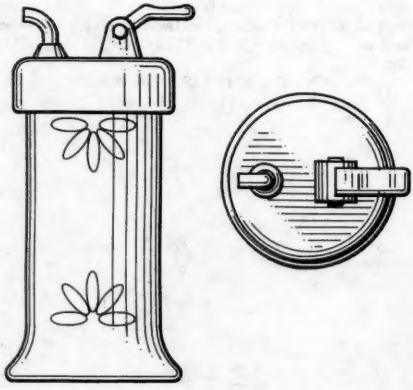
314,146
CONTAINER FOR FILM SPOOL
Christopher Scholz, New York, N.Y., assignor to Light & Shadow, Inc., Los Angeles, Calif.
Filed Feb. 16, 1988, Ser. No. 156,197
Term of patent 14 years
U.S. Cl. D9—420



314,147
UPPER PORTION OF A DISPENSER AND INTEGRAL CAP THEREFOR
Eugene E. Davis, Ilford, United Kingdom, assignor to Johnsen & Jorgensen, London, England
Filed Oct. 21, 1988, Ser. No. 215,427
Term of patent 14 years
U.S. Cl. D9—446

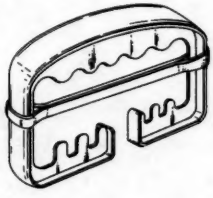


314,148
TOOTHPASTE DISPENSER
G. Brown Loper, 2626A Paces View, Atlanta, Ga. 30339
Filed Jun. 21, 1989, Ser. No. 369,671
Term of patent 14 years
U.S. Cl. D9—448



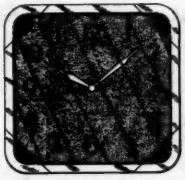
314,149
PUMP DISPENSER CLOSURE
Bruno Guilbert, Villeneuve Saint Georges, France, assignor to Reboul-Smt, Creteil, France
Filed Dec. 22, 1989, Ser. No. 454,848
Claims priority, application France, Jul. 26, 1989, 89 4792
Term of patent 14 years
U.S. Cl. D9—448

314,150
CARRYING HANDLE FOR GROCERY BAGS
Roberto Preciutti, 5883 Cape Horn Dr., Agoura Hills, Calif. 91301
Filed Mar. 7, 1988, Ser. No. 164,713
Term of patent 14 years
U.S. Cl. D9—455



314,151
CLOCK
Ruey-Jou Lin, 114, Yung-Cheng Rd., Tai Ping Hsiang, Taichung Hsien, Taiwan
Filed Feb. 9, 1988, Ser. No. 154,672
Term of patent 14 years
U.S. Cl. D10—22

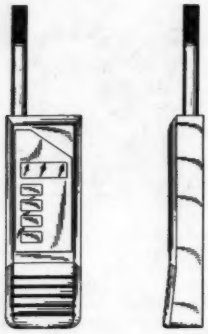
314,152
CLOCK
Keiko Mayuzumi, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Dec. 15, 1987, Ser. No. 132,917
Claims priority, application Japan, Aug. 21, 1987, 62-34015
Term of patent 14 years
U.S. Cl. D10—24



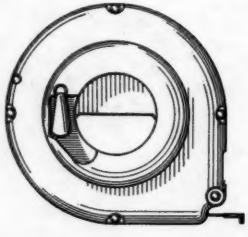
314,153
WRISTWATCH
Michel P. Ratajski, Bienne, Switzerland, assignor to Severin Montres AG, Zug, Switzerland
Filed Apr. 27, 1987, Ser. No. 43,102
Claims priority, application Int'l Pat. Institute, Oct. 31, 1986, DMA/000 547
Term of patent 14 years
U.S. Cl. D10—32

314,154
WRIST WATCH
Jean-Louis Dumas, Paris, France, assignor to La Montre Hermes, France
Filed Feb. 18, 1988, Ser. No. 157,243
Claims priority, application Switzerland, Aug. 26, 1987, DM/009172
Term of patent 14 years
U.S. Cl. D10—39

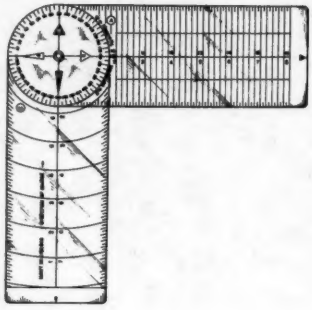
314,155
HUMIDITY AND TEMPERATURE METER
Timo Toivonen, Espoo, Finland, assignor to Vaisala Oy, Finland
Filed Sep. 6, 1988, Ser. No. 241,128
Claims priority, application Finland, Mar. 3, 1988, 183/88
Term of patent 14 years
U.S. Cl. D10—52



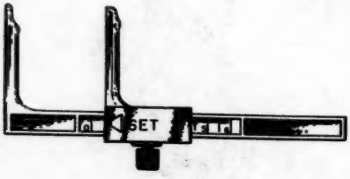
314,156
CHALK LINE
Mark E. Doyle, 13748 Malabar Ave., White Rock , B.C. V4B 2X9, Canada
Filed Nov. 18, 1988, Ser. No. 272,876
Term of patent 14 years
U.S. Cl. D10—61



314,157
COURSE PLOTTER
Norman C. Telles, 80 Middle Rd., Acushnet, Mass. 02743
Filed Sep. 23, 1988, Ser. No. 249,420
Term of patent 14 years
U.S. Cl. D10—65

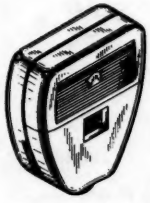


314,158
MEASURING GAUGE
Stanley Knebelman, Philadelphia, Pa., assignor to Craniometrics, Inc., Philadelphia, Pa.
Filed Aug. 22, 1988, Ser. No. 234,847
Term of patent 14 years
U.S. Cl. D10—73



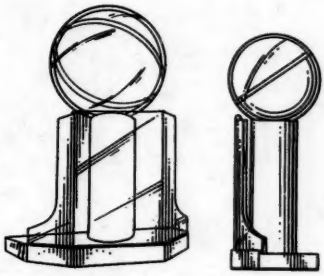
314,159
INFLATION TOOL
Michael E. O'Connor, 14319 River Rd., Walnut Grove, Calif. 95690
Filed Jun. 3, 1988, Ser. No. 202,039
Term of patent 14 years
U.S. Cl. D10—86

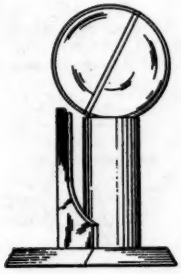
314,160
LIGHT ACTIVATED INTRUSION ALARM
Frederic W. Schwartz, Providence, R.I., assignor to Cable Electric Products, Inc., Providence, R.I.
Filed Apr. 29, 1988, Ser. No. 187,993
Term of patent 14 years
U.S. Cl. D10—106



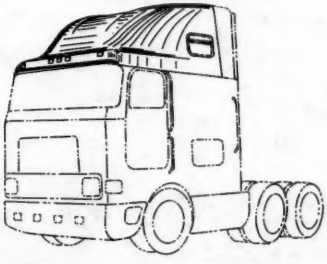
314,161
FLASHING EMERGENCY SIGNAL FOR VEHICLES
Yoshio Kondo, Room No. 311, Eruarukasaru Nishinippori, No. 29-11, Nishinippori 6-chome, Arakawa-ku, Tokyo, Japan
Continuation of Ser. No. 1,430, Jan. 8, 1987, abandoned. This application May 16, 1988, Ser. No. 194,287
Claims priority, application Japan, Jul. 31, 1986, 61-29806; Aug. 5, 1986, 61-119388
Term of patent 14 years
U.S. Cl. D10—114

314,162
COMBINED TROPHY BALL AND PICTURE DISPLAY STAND
David J. Long, 12216 Beaufait Ave., Northridge, Calif. 91326
Continuation-in-part of Ser. No. 805,453, Nov. 18, 1985, abandoned. This application Apr. 20, 1987, Ser. No. 39,937
Term of patent 14 years
U.S. Cl. D11—131

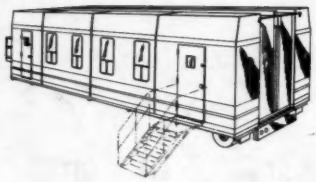




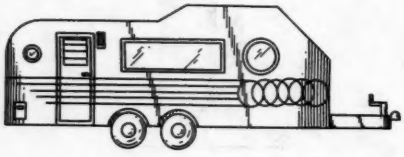
314,163
VEHICLE ROOF
Charles W. Harris; L. David Allendorph; Ronald L. Rhoades; Norman J. Wilson, all of Ft. Wayne, and James C. Duguid, Ossian, all of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.
Filed Mar. 29, 1989, Ser. No. 332,404
Term of patent 14 years
U.S. Cl. D12—96



314,164
EXPANDABLE DETENTION DORMITORY TRAILER OR THE LIKE
Gerald L. Barber, 10 Whittington Ct., and Wayne P. Comstock, 23 Selwyn Dr., both of Greenville, S.C. 29615
Filed Sep. 26, 1988, Ser. No. 249,082
Term of patent 14 years
U.S. Cl. D12—97

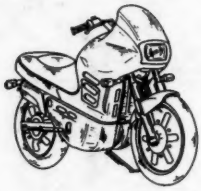


314,165
TRAILER
Mark E. Sanders, 1838 Harris St., Eureka, Calif. 95501
Filed Oct. 31, 1988, Ser. No. 250,493
Term of patent 14 years
U.S. Cl. D12—103



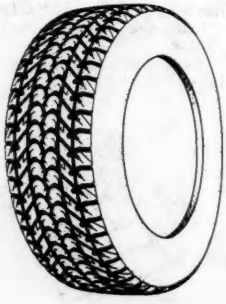
314,166
MOTOR SCOOTER
Orrin Shively, Los Angeles, and Masakazu Matsuzawa, San Pedro, both of Calif., assignors to Honda R&D North America, Inc., Torrance, Calif.
Filed Jul. 6, 1988, Ser. No. 215,922
Term of patent 14 years
U.S. Cl. D12—110

314,167
MOTOR CYCLE
Udo Kolter, Redondo Beach; Stuart Imai, Rancho Palos Verdes, and Yasuyuki Oshima, San Pedro, all of Calif., assignors to Honda R&D North America, Inc., Torrance, Calif.
Filed Jul. 6, 1988, Ser. No. 215,935
Term of patent 14 years
U.S. Cl. D12—110



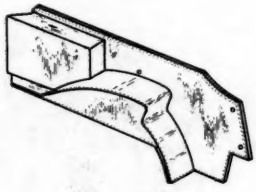
314,168
BICYCLE FORK PROTECTOR
James Mercogliano, 44 Santa Ana Ave., Long Beach, Calif. 90803
Filed Feb. 13, 1989, Ser. No. 309,547
Term of patent 14 years
U.S. Cl. D12—118

314,169
TIRE
Darrell E. Covert, Uniontown; Philip S. Hammond, Mogadore, and Paul B. Maxwell, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jul. 12, 1988, Ser. No. 218,595
Term of patent 14 years
U.S. Cl. D12—147

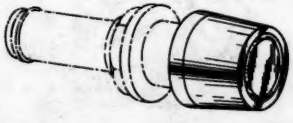


314,170
AUTOMOBILE TIRE
Yoshihiko Hasegawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Apr. 29, 1988, Ser. No. 187,884
Claims priority, application Japan, Oct. 31, 1987, 62-44699
Term of patent 14 years
U.S. Cl. D12—151

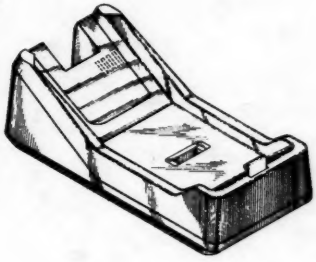
314,171
INTERIOR CARGO COVER FOR MOTOR VEHICLES
Thomas F. Hamilton, 1634 Ixias Ct., San Jose, Calif. 95124, assignor to Thomas F. Hamilton, San Jose, Calif.
Filed Nov. 25, 1987, Ser. No. 125,070
Term of patent 14 years
U.S. Cl. D12—155



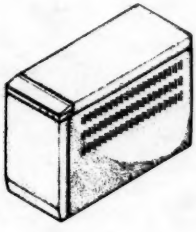
314,172
COVER FOR A SPLASH RESISTANT GAS VENT FOR BOATS
Warwick M. Whitley, II, Panama City, Fla., assignor to Attwood Corporation, Lowell, Mich.
Filed Jul. 8, 1988, Ser. No. 216,449
Term of patent 14 years
U.S. Cl. D12—317



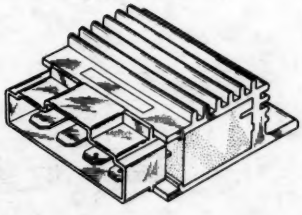
314,173
BATTERY CHARGER OR SIMILAR ARTICLE
Leonid Soren, Lincolnwood, and Gary R. Weiss, Wheeling, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Oct. 27, 1988, Ser. No. 263,484
Term of patent 14 years
U.S. Cl. D13—108



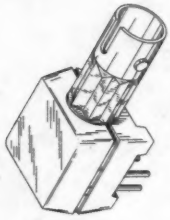
314,174
UNINTERRUPTIBLE POWER SUPPLY SYSTEM
Peter K. M. Wong, Jen Te Hsiang, Taiwan, assignor to Lumen Electronics Corporation, Tainan Hsien, Taiwan
Filed Aug. 4, 1989, Ser. No. 389,557
Term of patent 14 years
U.S. Cl. D13—123



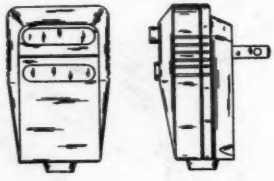
314,175
REGULATOR FOR A MOTORCYCLE
Yasunori Takeshita, and Masaru Kawayama, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Nov. 18, 1987, Ser. No. 122,882
Claims priority, application Japan, Jun. 4, 1987, 62-22987
Term of patent 14 years
U.S. Cl. D13—124



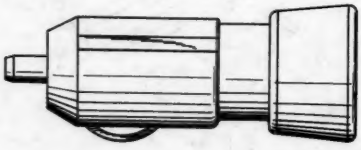
314,176
FIBER OPTIC COMPONENT
Jocelyn M. Weber, Palo Alto; Douglas M. Thom, Woodside, and Michael T. Kennedy, Mountain View, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.
Filed Sep. 30, 1987, Ser. No. 103,576
Term of patent 14 years
U.S. Cl. D13—133



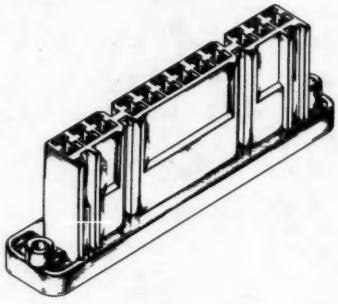
314,177
SAFETY CONTROL PLUG FOR APPLIANCES
Luc Heiligenstein; Francois Geneve, and Stephen Melamed, all of Chicago, Ill., assignors to Associated Mills Inc., Chicago, Ill.
Filed Feb. 29, 1988, Ser. No. 161,664
Term of patent 14 years
U.S. Cl. D13—142



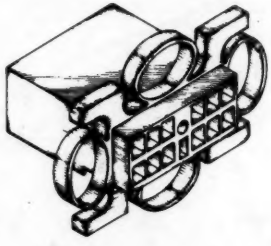
314,178
ELECTRICAL ADAPTOR PLUG FOR VEHICLE LIGHTER SOCKET FOR A POLICE RADAR WARNING RECEIVER
Fred J. Reber, Cincinnati, Ohio, assignor to Cincinnati Microwave, Inc., Cincinnati, Ohio
Filed Dec. 17, 1987, Ser. No. 134,451
Term of patent 14 years
U.S. Cl. D13—144



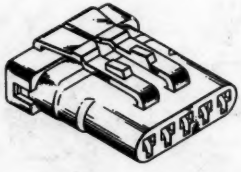
314,179
CONNECTOR HOUSING FOR A PRINTED CIRCUIT BOARD
Kikuo Ogawa, Shizuoka, Japan, assignor to Yazaki Corporation, Japan
Filed Dec. 30, 1987, Ser. No. 139,700
Claims priority, application Japan, Jun. 30, 1987, 62-26305
Term of patent 14 years
U.S. Cl. D13—147



314,180
HOUSING FOR ELECTRICAL CONNECTOR
Toshiro Maejima; Seiji Kozono, and Masaru Fukuda, all of Shizuoka, Japan, assignors to Yazaki Corporation, Japan
Filed Mar. 15, 1988, Ser. No. 168,339
Claims priority, application Japan, Sep. 16, 1987, 62-37495
Term of patent 14 years
U.S. Cl. D13—147



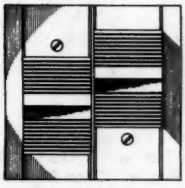
314,181
HOUSING FOR AN ELECTRICAL CONNECTOR
Sakai Yagi, and Kazuto Ootaka, both of Shizuoka, Japan, assignors to Yazaki Corporation, Japan
Filed Sep. 8, 1988, Ser. No. 242,054
Term of patent 14 years
U.S. Cl. D13—147



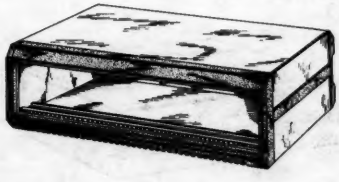
314,182
TEMPORARY UTILITY PEDESTAL
Paul G. Moerman, P.O. Box 3053, San Luis Obispo, Calif. 93403
Filed Oct. 20, 1988, Ser. No. 260,375
Term of patent 14 years
U.S. Cl. D13—152

314,183
UNINTERRUPTIBLE POWER SUPPLY
Peter K. M. Wong, Taipei, Taiwan, assignor to Lumen Electronics Corporation, Taipei, Taiwan
Filed Apr. 11, 1989, Ser. No. 337,033
Term of patent 14 years
U.S. Cl. D13—160

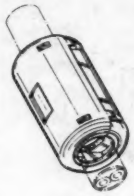
314,184
COMBINED WALL PLATE AND SWITCHES
Francois Mongeau, Ile Bizard, Canada, assignor to Nicolet Plastique Ltd., Nicolet, Canada
Filed May 19, 1988, Ser. No. 196,202
Claims priority, application Canada, Mar. 28, 1988, 28-03-88-5
Term of patent 14 years
U.S. Cl. D13—170



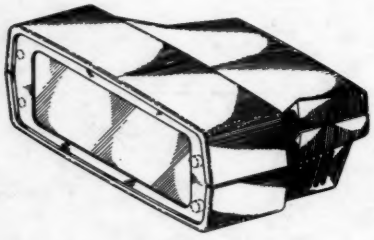
314,185
ELECTRONIC EQUIPMENT HOUSING
Paul Mazura, Karlsbad, and Johann Stein, Pforzheim, both of Fed. Rep. of Germany, assignors to Schroff GmbH, Straubenhardt, Fed. Rep. of Germany
Filed Jan. 7, 1988, Ser. No. 141,374
Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, MR X/4807
Term of patent 14 years
U.S. Cl. D13—184



314,186
CABLE SLEEVE FOR ABSORBING ELECTRIC NOISE
Akio Fujioka, Ichikawa, Japan, assignor to Kitagawa Industries Co., Ltd., Japan
Filed Jul. 10, 1989, Ser. No. 377,202
Claims priority, application Japan, Jan. 13, 1989, 1-957
Term of patent 14 years
U.S. Cl. D13—199

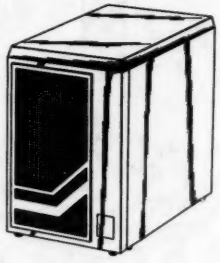


314,187
MOBILE DATA TERMINAL OR SIMILAR ARTICLE
Scott H. Richards, Sunrise; William R. Devenish, and Giovanni Jaramillo, both of Plantation, all of Fla., assignors to Motorola, Inc., Del.
Filed Apr. 10, 1989, Ser. No. 335,452
Term of patent 14 years
U.S. Cl. D14—100

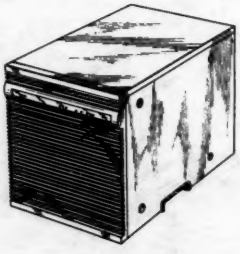


314,188
OPERATION ARITHMETIC CONTROLLER WITH MAGNETIC DISK FOR ELECTRONIC COMPUTER
Kenzo Izaki, Chiba, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Apr. 20, 1989, Ser. No. 344,021
Claims priority, application Japan, Nov. 8, 1988, 63-43505
Term of patent 14 years
U.S. Cl. D14—100

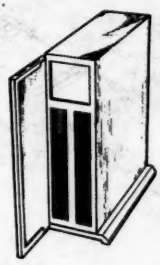
314,189
BACKUP MEMORY STORAGE UNIT FOR ELECTRONIC COMPUTER
Hideyuki Horie, Kamagaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Nov. 17, 1989, Ser. No. 437,926
Claims priority, application Japan, May 19, 1989, 1-18071
Term of patent 14 years
U.S. Cl. D14—100



314,190
DATA PROCESSOR
Minoru Aoyama, and Ei Yamamoto, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 18, 1989, Ser. No. 381,171
Claims priority, application Japan, Jan. 19, 1989, 1-1662
Term of patent 14 years
U.S. Cl. D14—100



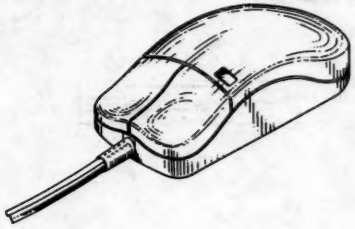
314,191
DESKTOP-COMPUTER HOUSING OR SIMILAR ARTICLE
Dale C. Bina, Wheaton, Ill., assignor to AT&T Bell Laboratories, Murray Hill, N.J.
Division of Ser. No. 92,114, Sep. 2, 1987, Pat. No. Des. 308,965.
This application Feb. 12, 1990, Ser. No. 478,887
Term of patent 14 years
U.S. Cl. D14—102



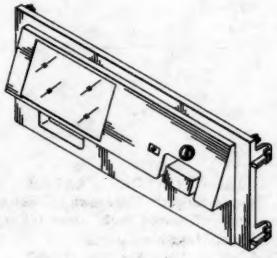
314,192
REAR GUARD COMPUTER SHIELD
Leo M. Lawlor, 633 18th & Grand, Ames, Iowa 50010
Filed Sep. 21, 1987, Ser. No. 99,202
Term of patent 14 years
U.S. Cl. D14—114

314,193
CONTROLLER FOR COMPUTER
Kousei Ishihara, and Henk B. Rogers, both of Kanagawa, Japan, assignors to Bullet-Proof Software Co. and Union Kogyo Co., Ltd., both of Kanagawa, Japan
Filed Dec. 30, 1987, Ser. No. 139,369
Term of patent 14 years
U.S. Cl. D14—114

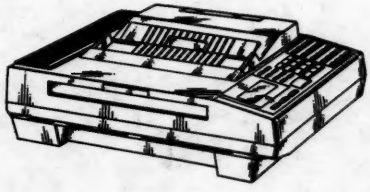
314,194
COMPUTER MOUSE
Ping Y. W. Norris, Tsuen Wan, Hong Kong, assignor to Hewlett-Packard Company, Palo Alto, Calif.
Filed Dec. 11, 1989, Ser. No. 449,257
Term of patent 14 years
U.S. Cl. D14—114



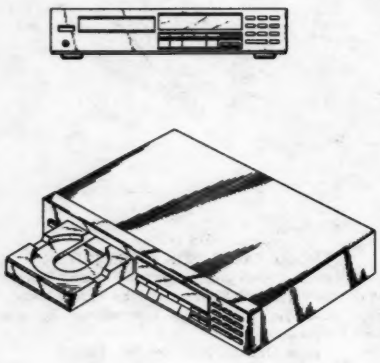
314,195
FRONT PANEL FOR A COMPUTER
Kevin K. Cooke, Delray Beach; Myron F. Davis, Boca Raton; John R. DeWitt, Boca Raton, and John E. McCloskey, Boca Raton, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Oct. 23, 1989, Ser. No. 425,881
Term of patent 14 years
U.S. Cl. D14—115



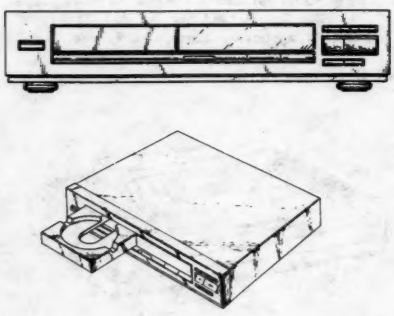
314,196
FACSIMILE TRANSCEIVER
Shin-ichi Hiroki, Tokyo, and Kunio Hara, Chiba, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Apr. 3, 1989, Ser. No. 332,221
Claims priority, application Japan, Oct. 4, 1988, 63-38753
Term of patent 14 years
U.S. Cl. D14—118



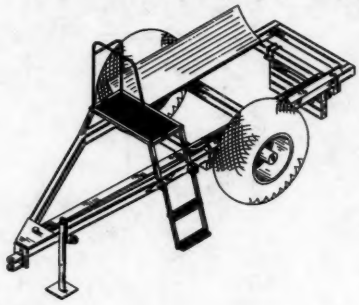
314,197
DIGITAL AUDIO DISC PLAYER
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Haruki Takita, Tokyo, and Minoru Sube, Hachioji, all of Japan, assignors to Teac Corporation, Masashino, Japan
Filed Jun. 27, 1988, Ser. No. 211,677
Claims priority, application Japan, Jan. 13, 1988, 63-1011
Term of patent 14 years
U.S. Cl. D14—156



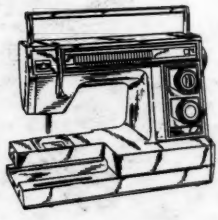
314,198
DIGITAL AUDIO DISC PLAYER
Masafumi Ito, Tokyo; Shigeru Hasegawa, Kodaira; Minoru Sube, Hachioji, and Yuji Sato, Choufu, all of Japan, assignors to Teac Corporation, Musashino, Japan
Filed Jul. 25, 1988, Ser. No. 224,867
Claims priority, application Japan, Mar. 18, 1988, 63-10996
Term of patent 14 years
U.S. Cl. D14—156



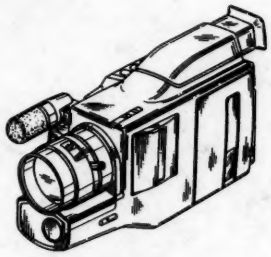
314,199
SPRAYER TRAILER
Wayne C. Dudley, Parkersburg, Iowa, assignor to Top Air Manufacturing Inc., Parkersburg, Iowa
Filed Sep. 6, 1988, Ser. No. 240,800
Term of patent 14 years
U.S. Cl. D15—27



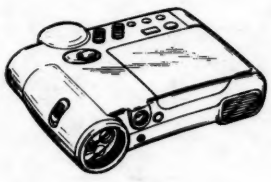
314,200
SEWING MACHINE
Koji Uchida, Hachioji, Japan, assignor to Janome Sewing Machine Co. Ltd., Tokyo, Japan
Filed Sep. 2, 1986, Ser. No. 903,117
The portion of the term of this patent subsequent to Mar. 10, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D15—70



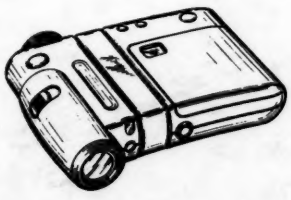
314,201
COMBINED CAMERA AND VIDEO TAPE RECORDER
Koichi Maeyama, Kawasaki, and Kimiyoshi Ban, Kasukabe, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jun. 10, 1988, Ser. No. 204,788
Claims priority, application Japan, Dec. 11, 1987, 62-50479
Term of patent 14 years
U.S. Cl. D16—202



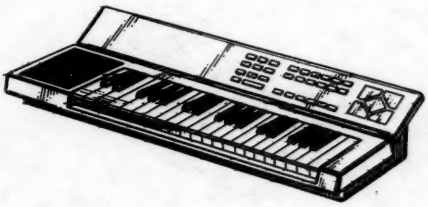
314,202
MAGNETIC DISC STILL CAMERA
Toru Shinano, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 13, 1988, Ser. No. 243,768
Claims priority, application Japan, Mar. 18, 1988, 63-11153
Term of patent 14 years
U.S. Cl. D16—202



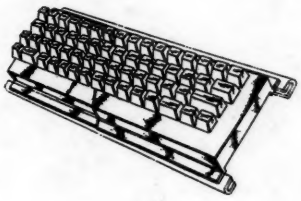
314,203
MAGNETIC DISC STILL CAMERA
Toru Shinano, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed May 2, 1989, Ser. No. 346,608
Claims priority, application Japan, Nov. 8, 1988, 63-49793
Term of patent 14 years
U.S. Cl. D16—202



314,204
ELECTRONIC KEYBOARD MUSICAL INSTRUMENT
Yasuo Yamawaki, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan
Filed Jul. 20, 1988, Ser. No. 221,771
Term of patent 14 years
U.S. Cl. D17—1



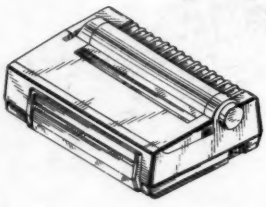
314,205
SPLITTABLE TYPIST KEYBOARD
Paul W. Lang, and Franklin C. Gribshaw, both of Orange, Calif., assignors to Harmonitronix, Inc., Los Angeles, Calif.
Filed Aug. 24, 1988, Ser. No. 236,116
Term of patent 14 years
U.S. Cl. D18—1



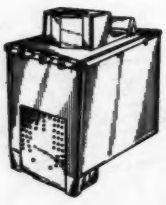
314,206
ELECTRONIC CALCULATOR
Yukinori Ido, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Apr. 20, 1987, Ser. No. 40,580
Claims priority, application Japan, Dec. 26, 1986, 61-52575
The portion of the term of this patent subsequent to Jan. 22, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—7

314,207
ELECTRONIC CALCULATOR
Toru Suzuki, Fussa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Aug. 24, 1988, Ser. No. 236,115
Term of patent 14 years
U.S. Cl. D18—7

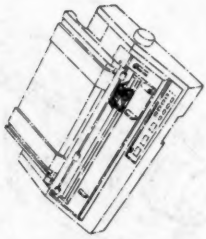
314,208
COMPUTER OUTPUT PRINTER
Hiroshi Hidaka; Yukio Terauchi, and Kenzo Mio, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Nov. 30, 1987, Ser. No. 127,013
Claims priority, application Japan, May 29, 1987, 62-21912
Term of patent 14 years
U.S. Cl. D18—13



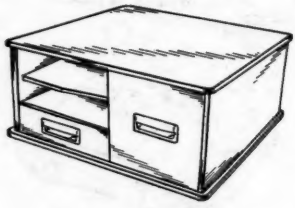
314,209
INK-JET PRINT CARTRIDGE
Donald R. McClelland, Brush Prairie, Wash.; John H. Dion; Niels J. Nielsen, both of Corvallis, Oreg.; J. Paul Harmon, Vancouver, Wash., and Robert N. Low, Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.
Filed Oct. 23, 1987, Ser. No. 113,083
Term of patent 14 years
U.S. Cl. D18—22



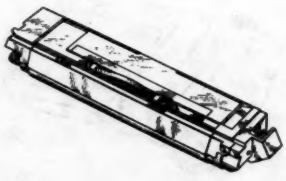
314,210
PRINTING HEAD FOR A PRINTER OF A COMPUTER
Koichi Kimura; Takeshi Matsumoto, and Fumio Ohtsuka, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan
Filed Feb. 16, 1989, Ser. No. 311,590
Claims priority, application Japan, Sep. 2, 1988, 63-34795
Term of patent 14 years
U.S. Cl. D18—22



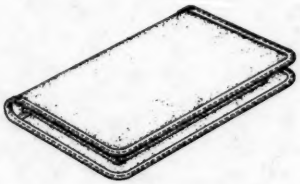
314,211
ORGANIZING SUPPORT STAND FOR LASER PRINTERS OR THE LIKE
Jack D. Bankier, Northbrook, Ill., assignor to Bankier Companies, Inc., Northbrook, Ill.
Filed Jan. 5, 1989, Ser. No. 293,656
Term of patent 14 years
U.S. Cl. D18—23

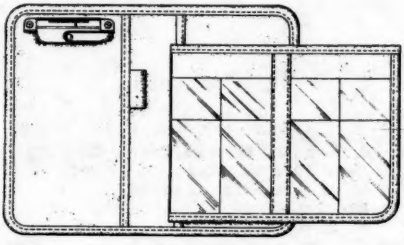


314,212
DEVELOPING DEVICE FOR COPYING MACHINE
Takeshi Komada, Yokohama, and Yutaka Okayama, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 19, 1988, Ser. No. 221,173
Claims priority, application Japan, Jan. 22, 1988, 63-2204
The portion of the term of this patent subsequent to Sep. 11, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—40

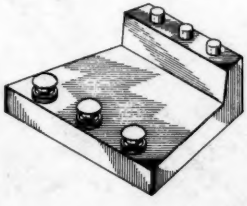


314,213
MEDICAL FOLDER
Thomas J. Bishop, Ten Lamson Rd., Barrington, R.I. 02806
Filed May 5, 1989, Ser. No. 347,932
Term of patent 14 years
U.S. Cl. D19—26



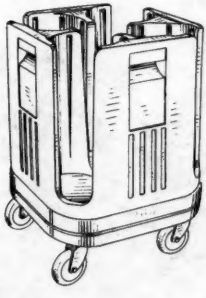


314,214
ELECTRONIC EDUCATIONAL DEVICE
Karen J. Perdue, 7415 Country Brook Dr., Indianapolis, Ind. 46260
Filed Apr. 25, 1988, Ser. No. 185,808
Term of patent 14 years
U.S. Cl. D19—59



314,215
DOCUMENT HOLDER OR SIMILAR ARTICLE
Robert E. Hawes, Jr., Huntington Bay, and Eric Aaldenberg, Bayside, both of N.Y., assignors to Esselte Pendaflex Corporation, Garden City, N.Y.
Filed Mar. 22, 1988, Ser. No. 171,923
Term of patent 14 years
U.S. Cl. D19—90

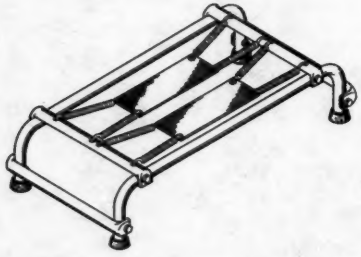
314,216
CART FOR STORING DISHES OR THE LIKE
Ronald C. Banko, North Wales, and Robert H. Nattress, Shavertown, both of Pa., assignors to InterMetro Industries Corporation, Wilkes-Barre, Pa.
Filed Sep. 17, 1987, Ser. No. 97,935
Term of patent 14 years
U.S. Cl. D21—56



314,217
SIMULATIVE TOY DOLL HOUSE
Frances J. Newman, P.O. Box 32, Pickens, Ark. 71662
Filed Feb. 8, 1988, Ser. No. 153,798
Term of patent 14 years
U.S. Cl. D21—115

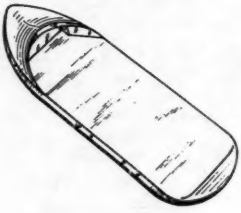
314,218
DOLL
Victoria McCharen, 699 Helen Dr., Hollister, Calif. 95023
Filed Dec. 14, 1987, Ser. No. 132,103
Term of patent 14 years
U.S. Cl. D21—171

314,219
LOWER BODY PHYSICAL EXERCISER
Yuan-Hung Lo, 3Fl., No. 85, Sec. 2, Chien-Kuo North Road, Taipei, Taiwan
Filed May 13, 1988, Ser. No. 193,865
Term of patent 14 years
U.S. Cl. D21—191

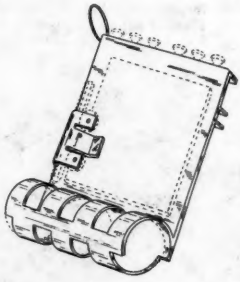


314,220
GOLF CLUB HEAD
Dillis V. Allen, 240 Lincolnshire Ct., Schaumburg, Ill. 60193
Filed Aug. 17, 1988, Ser. No. 232,884
Term of patent 14 years
U.S. Cl. D21—214

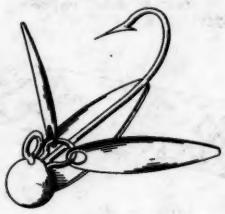
314,221
SHORT SNOW SKI
Michael C. Miner, 24680 Butler Rd., Junction City, Oreg. 97448
Filed May 30, 1989, Ser. No. 357,864
Term of patent 14 years
U.S. Cl. D21—229



314,222
GOLF ACCESSORY HOLDER
Richard S. Viguers; Scott W. Beeninga, and Randy O. Beeninga, all of Greensboro, N.C., assignors to Kaddee International Corporation, Greensboro, N.C.
Filed Nov. 13, 1989, Ser. No. 435,782
Term of patent 14 years
U.S. Cl. D21—234

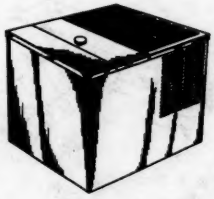


314,223
FISHING LURE
Ronald W. Anderson, R.R. 3, Box 230C, Decorah, Iowa 52101
Filed Jul. 25, 1988, Ser. No. 223,771
Term of patent 14 years
U.S. Cl. D22—129

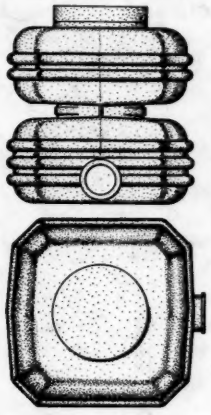


314,224
CONDENSATE SEPARATOR
Gunther V. Stein, Grafrath, Fed. Rep. of Germany, assignor to Veit GmbH & Co., Landsberg/Lech, Fed. Rep. of Germany
Filed Oct. 30, 1987, Ser. No. 115,357
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, MR 4688
Term of patent 14 years
U.S. Cl. D23—200

314,225
WATER DISTILLATION UNIT
David G. Palmer, and David J. Shannon, both of Lincoln, Nebr., assignors to Pure Water, Inc., Lincoln, Nebr.
Filed Feb. 25, 1988, Ser. No. 160,081
Term of patent 14 years
U.S. Cl. D23—207



314,226
WATER FILTER FOR HOME USE
Frank M. Devine, and Shapirol Rod D., both of 1933 S. Broadway, Suite 300, Los Angeles, Calif. 90007
Filed Sep. 25, 1989, Ser. No. 411,597
Term of patent 14 years
U.S. Cl. D23—209

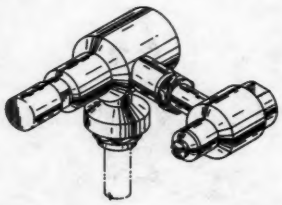


314,227
SPRINKLER
Joseph T. Christ, Dyer, Ind., assignor to Craft Creations Co., Inc., Dyer, Ind.
Filed Nov. 14, 1988, Ser. No. 270,112
Term of patent 14 years
U.S. Cl. D23—215

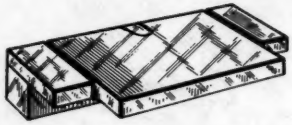
314,228
FAUCET
Andreas Haug, and Thomas Schönherr, both of Stuttgart, Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Aug. 29, 1988, Ser. No. 237,880
Claims priority, application Fed. Rep. of Germany, Feb. 29, 1988, MR 1341 OB; Jun. 29, 1988, MR 1359
Term of patent 14 years
U.S. Cl. D23—238

FIG.1

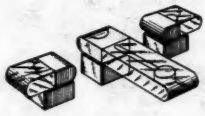
314,229
FLUSH CONTROL VALVE
R. Frank Nestich, Glenmont, Ohio, assignor to Mansfield Plumbing Products, Inc., Perrysville, Ohio
Filed Nov. 4, 1988, Ser. No. 266,990
Term of patent 14 years
U.S. Cl. D23—233



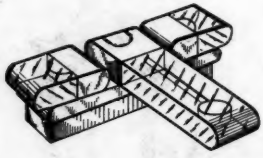
314,230
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,648
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



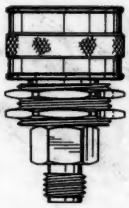
314,231
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,012
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—242



314,232
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,018
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



314,233
QUICK-CONNECT COUPLING FOR A BULKHEAD
Richard J. Medvick, Shaker Heights, Ohio, assignor to Swagelok Quick-Connect Co., Hudson, Ohio
Filed Feb. 8, 1988, Ser. No. 153,039
Term of patent 14 years
U.S. Cl. D23—262

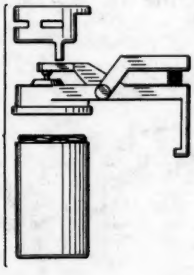


314,234
QUICK-CONNECT COUPLING
Brook J. Beaston, Wichita, Kans., assignor to Great Plains Industries, Inc., Wichita, Kans.
Filed Feb. 26, 1988, Ser. No. 160,506
Term of patent 14 years
U.S. Cl. D23—262

314,235
ROOF GUTTER
Gordon Stuart, Holland Park, Australia, assignor to Ed Barador Holdings Pty. Ltd., Queensland, Australia
Filed Aug. 30, 1988, Ser. No. 238,165
Claims priority, application Australia, May 30, 1988, 1738/88
Term of patent 14 years
U.S. Cl. D23—267

314,236
WATER CLOSET
Myron J. Ament, Plano, Tex., assignor to Eljer Manufacturing, Inc., Plano, Tex.
Filed Sep. 9, 1988, Ser. No. 243,014
Term of patent 14 years
U.S. Cl. D23—301

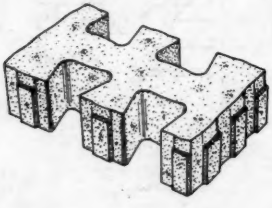
314,237
AUTOMATIC DEODORIZER
Norman L. Blumanthal, Jr., 1243 Cheyenne, Alliance, Nebr. 69301
Filed May 26, 1989, Ser. No. 357,490
Term of patent 14 years
U.S. Cl. D23—366



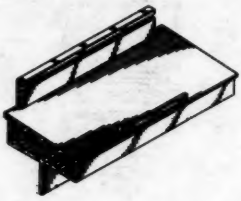
314,238
NOZZLE
George Gori, Teaneck, N.J., assignor to Schmid Laboratories Inc., Little Falls, N.J.
Filed Sep. 15, 1987, Ser. No. 97,434
Term of patent 14 years
U.S. Cl. D24—61

314,239
DECORATIVE GLASS PANEL
Norbert J. Guetle, Jr., Cincinnati, and B. Jeremiah Shaffer, Worthington, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio
Filed Jan. 30, 1989, Ser. No. 302,860
Term of patent 14 years
U.S. Cl. D25—103

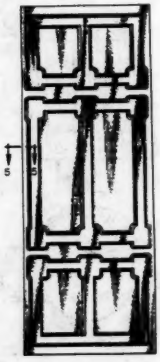
314,240
LAWN STONE
Rolf Scheiwiller, Buolterlistrasse 9, 6052 Hergiswil, Switzerland
Filed Mar. 20, 1989, Ser. No. 325,474
Claims priority, application Int'l Pat. Institute, Oct. 31, 1986, DMA/000863
Term of patent 14 years
U.S. Cl. D25—113



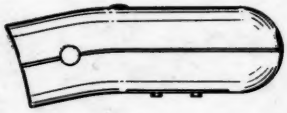
314,241
EXTRUDED MASTER FRAME WINDOW SILL
Leon F. Slocomb, Jr., 2641 W. Robino Dr., Wilmington, Del. 19808
Filed Aug. 21, 1989, Ser. No. 396,028
Term of patent 14 years
U.S. Cl. D25—124

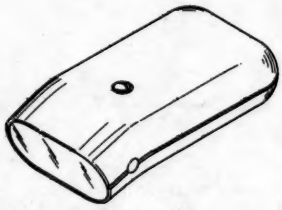


314,242
WALL PANEL OR SIMILAR ARTICLE
Joseph F. Mikolaitis, Cherry Hill, N.J., assignor to Antiquity Ltd., Cherry Hill, N.J.
Filed Jan. 26, 1989, Ser. No. 303,530
Term of patent 14 years
U.S. Cl. D25—138



314,243
LAMP FOR A BICYCLE
Takashi Ueda, Izumi, Japan, assignor to Cat Eye Co., Ltd., Osaka, Japan
Filed Mar. 17, 1989, Ser. No. 324,625
Claims priority, application Japan, Sep. 21, 1988, 63-37338
Term of patent 14 years
U.S. Cl. D26—28

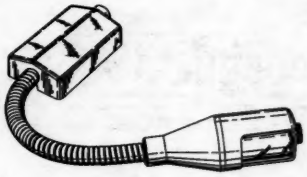




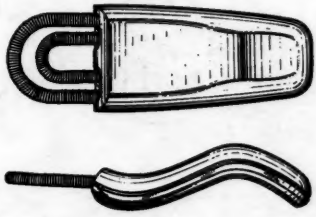
314,244
AUXILIARY VEHICLE STOP LIGHT
Naoki Matsumura; Tsutomu Machida, and Toshiyasu Mochizuki, all of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Shizuoka, Japan
Filed Mar. 20, 1989, Ser. No. 326,123
Claims priority, application Japan, Sep. 19, 1988, 63-36827
Term of patent 14 years
U.S. Cl. D26—35

314,245
COMBINED FLASHLIGHT AND CLOCK
Judith Van Brunschot, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Oct. 11, 1988, Ser. No. 256,890
Claims priority, application United Kingdom, Apr. 18, 1988, 1.050.041
Term of patent 14 years
U.S. Cl. D26—54

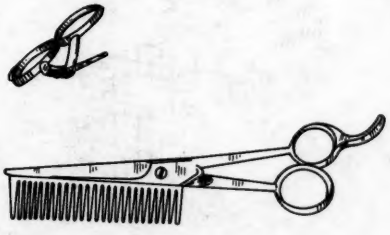
314,246
ADJUSTABLE LAMP
David E. Bache, Knowle, England, assignor to Alexander Engineering, Company Limited, Bucking Hamshire, Great Britain
Filed Jan. 14, 1988, Ser. No. 144,025
Term of patent 14 years
U.S. Cl. D26—62



314,247
DEPILATOR
Noah Amit, Haifa, Israel, assignor to Aris Enterprises, Ltd., New York, N.Y.
Filed Jul. 19, 1988, Ser. No. 221,563
Term of patent 14 years
U.S. Cl. D28—10



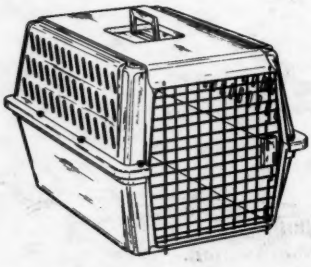
314,248
COMBINED SCISSORS AND ANGLED-BLADE COMB
Donald R. Jokinen, HC 2 Box 1046, Spread Eagle, Wis. 54121
Filed Jul. 30, 1987, Ser. No. 79,789
Term of patent 14 years
U.S. Cl. D28—25



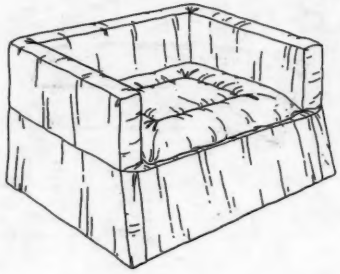
314,249
RAZOR BLADE CARTRIDGE
Peter Bowman, New Haven, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Filed Apr. 5, 1988, Ser. No. 178,996
Term of patent 14 years
U.S. Cl. D28—47

314,250
CAP FOR COSMETIC CASE
Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein
Division of Ser. No. 119,404, Nov. 12, 1987. This application Nov. 7, 1989, Ser. No. 432,977
Claims priority, application Fed. Rep. of Germany, May 13, 1987, URA690/87
Term of patent 14 years
U.S. Cl. D28—84

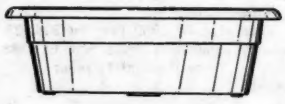
314,251
PORTABLE PET KENNEL
Ralph Van Skiver, Arlington, Tex., assignor to Doskocil Manufacturing Co., Inc., Arlington, Tex.
Filed Sep. 28, 1987, Ser. No. 101,767
The portion of the term of this patent subsequent to Nov. 20, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D30—109



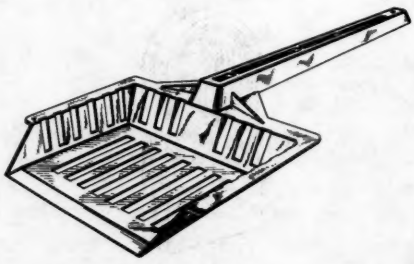
314,252
PET CHAIR
Rhonda D. Horne, R.R. #1, Moffat, Ontario, Canada L0P 1J0
Filed Aug. 14, 1987, Ser. No. 85,131
Claims priority, application Canada, Mar. 9, 1987, 09-03-87-1
Term of patent 14 years
U.S. Cl. D30—118



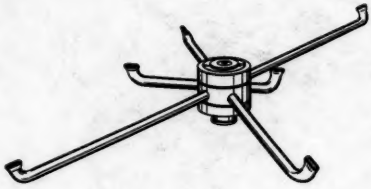
314,253
ANIMAL FEEDING DISH
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries, Inc., Valley Forge, Pa.
Filed Aug. 10, 1988, Ser. No. 230,508
Term of patent 14 years
U.S. Cl. D30—129



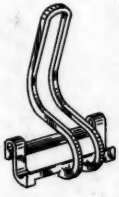
314,254
LITTER SCOOP
Richard A. Gordon, 93 W. 3rd St., Freeport, N.Y. 11522
Filed Apr. 25, 1990, Ser. No. 514,370
Term of patent 14 years
U.S. Cl. D30—162



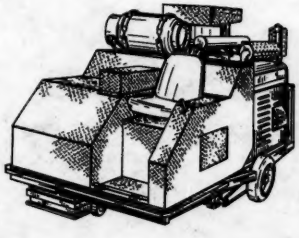
314,255
WASH ARM FOR A DISHWASHER
Ralph Brito, 1514 Trenton Pl., Anaheim, Calif. 92802
Filed Feb. 8, 1988, Ser. No. 153,025
Term of patent 14 years
U.S. Cl. D32—3



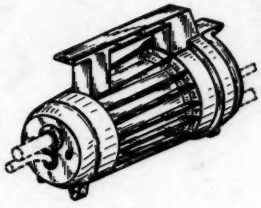
314,256
REMOVABLE ARTICLE HOLDER FOR A DISHWASHER
Ginger E. Patera; Larry L. Janke, and William T. Lampman, all of St. Joseph, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed Dec. 30, 1988, Ser. No. 291,999
Term of patent 14 years
U.S. Cl. D32—3



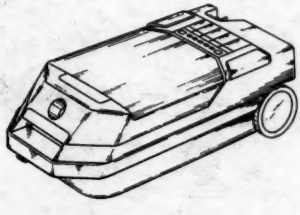
314,257
SURFACE CLEANING VEHICLE
Robert E. Hoover, Toledo, Ohio, assignor to Hoover & Wells, Inc., Toledo, Ohio
Filed May 6, 1988, Ser. No. 190,951
Term of patent 14 years
U.S. Cl. D32—15



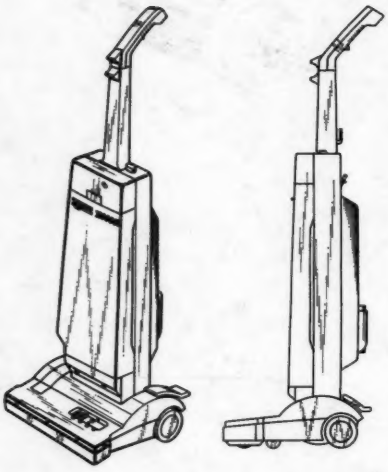
314,258
POWER WASHER
Glenn M. Campbell, Sr.; Glenn M. Campbell, Jr., both of Plymouth; H. David Dalquist, III, Minnetonka; Douglas J. Kluge, Golden Valley, and John N. Taylor, St. Louis Park, all of Minn., assignors to Northland Aluminum Products, Inc., Minneapolis, Minn.
Filed May 22, 1989, Ser. No. 354,937
Term of patent 14 years
U.S. Cl. D32—17



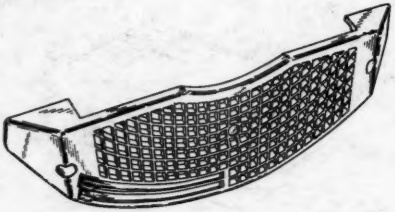
314,259
VACUUM CLEANER
Chul H. Kim, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Jun. 7, 1988, Ser. No. 203,759
Claims priority, application Rep. of Korea, Dec. 19, 1987, 18959/1987
Term of patent 14 years
U.S. Cl. D32—21



314,260
VACUUM CLEANER
Soon I. Lee, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed May 22, 1989, Ser. No. 355,311
Claims priority, application Rep. of Korea, Nov. 26, 1988, 88-15908
Term of patent 14 years
U.S. Cl. D32—22

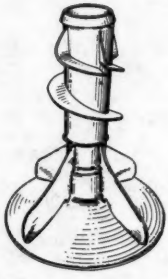


314,261
DRYER OUTLET SCREEN OR THE LIKE
Keith E. Carr, Stevensville, and Karl Jautakis, Sawyer, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed Dec. 30, 1988, Ser. No. 292,630
Term of patent 14 years
U.S. Cl. D32—25

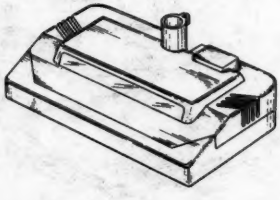


314,262
HEATED DRY RACK OR THE LIKE
Gerald L. Kretchman, St. Joseph, and James Ignatius, Stevensville, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed Dec. 30, 1988, Ser. No. 292,570
Term of patent 14 years
U.S. Cl. D32—25

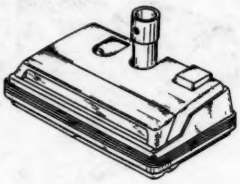
314,263
AUTOMATIC WASHER AGITATOR OR THE LIKE
Dale E. Mueller, Benton Harbor, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.
Filed Dec. 30, 1988, Ser. No. 292,480
Term of patent 14 years
U.S. Cl. D32—26



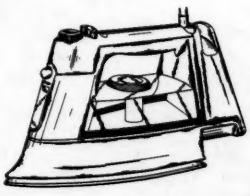
314,264
POWER NOZZLE FOR VACUUM CLEANER
Chul H. Kim, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Jun. 7, 1988, Ser. No. 203,147
Claims priority, application Rep. of Korea, Dec. 19, 1987, 18960/1987
Term of patent 14 years
U.S. Cl. D32—33



314,265
POWER NOZZLE FOR VACUUM CLEANER
Goon S. Hong, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea
Filed Jun. 7, 1988, Ser. No. 203,148
Claims priority, application Rep. of Korea, Dec. 31, 1987, 20011/1987
Term of patent 14 years
U.S. Cl. D32—33

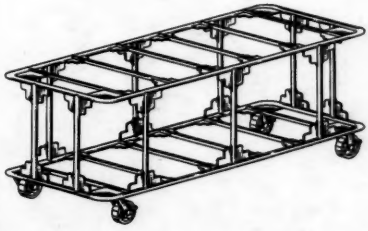


314,266
IRON
Ludwig Littmann, Königstein/Ts, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany
Filed Jun. 28, 1988, Ser. No. 212,757
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1988, 73MR9652
The portion of the term of this patent subsequent to Feb. 5, 2005, has been disclaimed.
Term of patent 14 years
U.S. Cl. D32—70



314,267
STEAM IRON
Marshall B. Johnson, Mechanicsville, and John C. Meadway, Richmond, both of Va., assignors to Proctor-Silex, Inc., Glen Allen, Va.
Filed Oct. 3, 1988, Ser. No. 252,868
Term of patent 14 years
U.S. Cl. D32—70

314,268
MOBILE REFUSE BIN
Randy P. Barenaba, 55-162 Puuahi St., Laie, Oahu, Hi. 96762
Filed Sep. 26, 1988, Ser. No. 249,096
Term of patent 14 years
U.S. Cl. D34—5



314,269

SHOPPING CART

Antoine Trubiano, Montreal, Canada, assignor to Cari-All Inc., Montreal East, Canada

Filed Feb. 22, 1988, Ser. No. 159,054

Term of patent 14 years

U.S. Cl. D34—19

314,270

CONCRETE CHUTE

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Filed Apr. 3, 1989, Ser. No. 332,112

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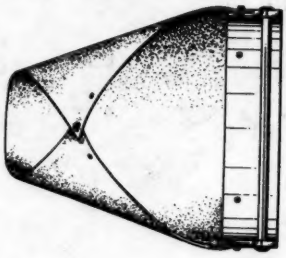

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TO WHOM

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Arco Chemical Technology, Inc.: *See*—
Gelb, Morris; Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 4,988,830, Cl. 549-529.000.

Aref, Hassan: *See*—
Hawkins, James P.; and Aref, Hassan, 4,988,016, Cl. 222-92.000.

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Ajika, Natsuo; and Arima, Hideaki, 4,988,635, Cl. 437-43.000.

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Arneson Products, Inc.: *See*—
Gefter, Alexander A.; and Marshall, Kenneth N., 4,988,437, Cl. 210-237.000.

Arnold, Stephen C.: *See*—
Paul, Charles W.; Patel, Kundan M.; and Arnold, Stephen C., 4,988,785, Cl. 526-259.000.

Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., to Amoco Corporation. Olefin polymerization catalyst. 4,988,656, Cl. 502-127.000.

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Uchida, Takateru, 4,988,786, Cl. 526-261.000.

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Ishii, Haruo; Kohmoto, Shinsuke; and Nomura, Hiroshi, 4,989,027, Cl. 354-253.000.
Morisawa, Tahei, 4,989,109, Cl. 360-106.000.

Asal, Kim, to Texas Instruments Incorporated. Data processing device having direct memory access with improved transfer control. 4,989,113, Cl. 364-200.000.

Asama Corporation: *See*—
Yamada, Masatoshi, 4,988,139, Cl. 296-97.200.

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Asea Brown Boveri Ltd.: *See*—
Dersch, Helmut, 4,988,669, Cl. 505-1.000.

Ashdown, Michael B.: *See*—
Martensson, Nils E. W.; and Ashdown, Michael B., 4,989,012, Cl. 343-702.000.

Ask, David T.: *See*—
LaBelle, Gary E.; and Ask, David T., 4,988,612, Cl. 430-531.000.

Associated Universities, Inc.: *See*—
VanZwienen, William H., 4,988,878, Cl. 250-397.000.

Association pour la Recherche et le Developpment des Methodes et Processus Industriels - Armines: *See*—
Breuil, Philippe; Pijolat, Christophe; Tournier, Guy; and Lalauze Rene , 4,988,539, Cl. 427-126.300.

AT&T Bell Laboratories: *See*—
Birch, Laurie L., 4,988,834, Cl. 174-93.000.
Davidson, Wayne A.; and Hossain, Sahadat, 4,988,209, Cl. 370-58.200.
Glance, Bernard, 4,989,201, Cl. 370-3.000.
Hwang, Frank K.; and Richards, Gaylord W., 4,988,993, Cl. 340-825.800.
Hwang, Frank K.; and Richards, Gaylord W., 4,989,022, Cl. 340-825.800.
Martin, Edward P., Jr.; Schutz, Ronald J.; and Smolinsky, Gerald, 4,988,405, Cl. 156-657.000.
Ortiz, Marcos G.; and Stix, Marsha S., 4,988,875, Cl. 250-330.000.
Rzeszewski, Theodore S., 4,989,199, Cl. 370-1.000.
Tanzola, Charles, 4,988,311, Cl. 439-404.000.
Ter Haar, Leonard W.; and Trumbore, Forrest A., 4,988,587, Cl. 429-194.000.

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Okesaku, Masahiro; Miyahara, Michito; Ataka, Ryosuke; and Nakagawa, Torru, 4,987,930, Cl. 139-435.500.

Atari Corporation: *See*—
Needle, David L., 4,988,892, Cl. 307-269.000.

Atco Rubber Products, Inc.: *See*—
Anderson, Charles B., 4,987,996, Cl. 206-321.000.

Atkinson, John, to Grove Coles Limited. Telescopic boom mobile cranes. 4,988,009, Cl. 212-182.000.

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Atrium Medical Corporation: *See*—
Herweck, Steve A.; and Karwoski, Theodore, 4,988,342, Cl. 604-321.000.

Atsumi, Kunio; Iwamatsu, Katsuyoshi; Sakagami, Kenji; Ogino, Hiroko; and Yoshida, Takashi, to Meiji Seika Kabushiki Kaisha. Cephem compounds and anti-bacterial agent. 4,988,686, Cl. 514-203.000.

Atsushi, Ogura, to Okura Techno-Research Kabushiki Kaisha. Homogeneous solid solution material and method of manufacturing the same. 4,988,648, Cl. 501-126.000.

Atwell, William A.: *See*—
Pesheck, Peter S.; Atwell, William A.; Krawiecki, Madonna M.; and Anderson, George R., 4,988,841, Cl. 219-10.55M.

Augustus Martin Limited: *See*—
Stevens, Melvyn J. W., 4,987,810, Cl. 83-176.000.

Auximat-Levage: *See*—
Petit, Gaston; and Monteiro, Daniel, 4,987,688, Cl. 34-69.000.

Avantek, Inc.: *See*—
Khanna, Amarpal S.; and Davis, Derek, 4,988,959, Cl. 331-117.00D.

Awaji, Hiroshi: *See*—
Uekita, Masakazu; and Awaji, Hiroshi, 4,988,795, Cl. 528-353.000.

Awajitani, Takahisa; Terasaka, Masayuki; Takemura, Masakazu; and Honda, Hironori, to Sanyo Electric Co., Ltd. Paste-type cadmium electrode for use in an alkaline storage cell and its manufacturing method. 4,988,589, Cl. 429-222.000.

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Doyle, Walter M., 4,988,195, Cl. 356-244.000.

Ayers, Alan D.: *See*—
O'Hara, Thomas J.; Ayers, Alan D.; and Malay, Manuel R., 4,988,585, Cl. 429-66.000.

Azria, Moise, to Sandoz Ltd. Nasal pharmaceutical compositions. 4,988,512, Cl. 424-422.000.

B. F. Goodrich Company, The: *See*—
Dickens, E. Douglas, Jr.; and Mazany, Anthony M., 4,988,755, Cl. 524-401.000.
Murphy, Walter T.; Tseng, Hsiungto S.; and Kolycheck, Edmond G., 4,988,574, Cl. 428-425.900.
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Babcock Industries, Inc.: *See*—
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Babczinski, Peter: *See*—
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Baby Bumpers, Inc.: *See*—
Danna, Jori L.; and Bauer, Mary M., 4,988,138, Cl. 293-127.000.

Bach, David T.: *See*—
Li, May K.; Kessler, Jack; and Bach, David T., 4,988,618, Cl. 435-6.000.

Baehr, Fred J., Jr.: *See*—
Kemeny, George A.; and Baehr, Fred J., Jr., 4,987,821, Cl. 89-8.000.

Baier, Terence D., to American Standard Inc. Thermistor probe for exposed sensing element for direct immersion in refrigerant flows. 4,987,749, Cl. 62-222.000.

Bailey, Denis M.; and Powles, Ronald G., to Sterling Drug Inc. 1H-pyrazole-1-(branched)alkanamides as antiarrhythmic agents, compositions and use. 4,988,725, Cl. 514-406.000.

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Fury, Tommy J.; and Bailey, Gerald D., 4,988,974, Cl. 340-431.000.

Baiuley, David E.; and Bingisser, Josef E., to Ropak Corporation. Frangible fastening construction for handles and method of fastening. 4,987,639, Cl. 16-126.000.

Baldoni, Joseph G., II: *See*—
D'Angelo, Charles; Baldoni, Joseph G., II; and Buljan, Sergej-Tomislav, 4,988,564, Cl. 428-368.000.

Balisky, Todd A., to Boeing Company, The. Automated chemical milling controller. 4,989,157, Cl. 364-500.000.

Ballan, Akeel, to Coloplast A/S. Drainable pouch for collecting excretions from the human body. 4,988,343, Cl. 604-332.000.

Ballas, Werner: *See*—
Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, 4,988,748, Cl. 524-141.000.

Bambenek, Theodore R.: *See*—
Manns, William G.; Wood, Anthony B.; Norwood, David A.; and Bambenek, Theodore R., 4,989,255, Cl. 382-8.000.

Banthia, Vinod K.; Long, Russell S.; and Klingensmith, James D., to Aluminum Company of America. Extruded node. 4,988,230, Cl. 403-170.000.

Banyu Pharmaceutical Co., Ltd.: *See*—
Ishikawa, Kiyofumi; Fukami, Takehiro; Naganuma, Hiroshi; and Nakamichi, Kyoko, 4,988,681, Cl. 514-93.000.
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Barbee, Robert B.; and Phillips, Brian S., to Eastman Kodak Company. Powder coating compositions. 4,988,793, Cl. 528-272.000.

Barbere, Michael D.: *See*—
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Barkans, Anthony C.; and Lach, Jorge, to Schlumberger Technology Corporation. Method and apparatus for a self-clearing copy mode in a frame-buffer memory. 4,988,985, Cl. 340-750.000.

Barnadas, Miguel S. Trap for steam condensates. 4,987,918, Cl. 137-171.000.

Barnes, Sharon J.; Beutnagel, James W.; Mack, Russel T.; Mills, Aaron A.; and Smith, John, III, to Dow Chemical Company, The. Process and apparatus for contactless measurement of sample temperature. 4,988,211, Cl. 374-121.000.

Barnes, Stephen G., to Lever Brothers Company, Division of Conopco, Inc. Detergent bleach composition and method of cleaning fabrics. 4,988,363, Cl. 8-111.000.

Barnett, Ewin H., III, to Carfax, Inc. Method and system for identifying and displaying discrepancies in vehicle titles. 4,989,144, Cl. 364-419.000.

Baroid Technology, Inc.: *See*—
Darlington, Roy K., 4,987,960, Cl. 175-42.000.

Barrett, Philip D.; Henderson, Walter G.; and Larson, Wayne F., to Supra Products, Inc. Keysafe system with timer/calendar features. 4,988,987, Cl. 340-825.310.

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Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,988,721, Cl. 514-383.000.
Bronstert, Klaus, 4,988,773, Cl. 525-332.900.
Lauer, Manfred; Zipplies, Matthias; Sauter, Hubert; Moore, Barbara A.; Carlson, Dale R.; Zorner, Paul S.; Westphalen, Karl-Otto; and Wuerzer, Bruno, 4,988,818, Cl. 548-267.400.
Loeffler, Hermann; and Patsch, Manfred, 4,988,802, Cl. 534-634.000.

BASF Lacke & Farben Aktiengesellschaft: *See*—
Batzill, Wolfgang; Heilmann, Ulrich; Streitberger, Hans J.; Guder, Harald; and Beck, Fritz, 4,988,420, Cl. 204-181.100.
Jung, Werner; and Sievers, Axel, 4,988,760, Cl. 524-555.000.

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Batruni, Roy G.; and Wilson, Howard A., to National Semiconductor Corporation. Hybrid stochastic gradient for convergence of adaptive filter. 4,989,170, Cl. 364-724.190.

Batz, Hans-Georg: *See*—
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Bauer, Helmut; and Wilkens, Gunter, to Oxytechnik Gesellschaft. Device to cut and butt-weld bands or metal sheets having limited dimensions. 4,988,845, Cl. 219-121.630.

Bauer, Mary M.: *See*—
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Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, to BASF Aktiengesellschaft. 0-(1,2,4-triazol-1-yl) o-phenyl acetals useful as fungicides. 4,988,721, Cl. 514-383.000.

Bausch, Paul, to General Motors Corporation. Electric motor-driven positioning element. 4,987,788, Cl. 74-89.150.

Baxter International Inc.: *See*—
D'Silva, Edmund D., 4,988,069, Cl. 248-605.000.

Bayer Aktiengaesellschaft: *See*—
Stroech, Klaus; Brandes, Wilhelm; and Dutzmann, Stefan, 4,988,819, Cl. 548-267.800.

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Angerbauer, Rolf; Hubsch, Walter; Fey, Peter; Bischoff, Hilmar; Petzinna, Dieter; Schmidt, Delf; and Thomas, Gunter, 4,988,711, Cl. 514-326.000.
Bockmann, Klaus; Regel, Erik; Buchel, Karl H.; Lurssen, Klaus; and Konze, Jorg, 4,988,382, Cl. 71-92.000.
Boshagen, Horst; Rosentreter, Ulrich; Lieb, Folker; Oediger, Hermann; Seuter, Friedel; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 4,988,820, Cl. 548-439.000.
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.
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Elbe, Hans-Ludwig; Kranz, Eckart; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,988,715, Cl. 514-383.000.
Fauss, Rudolf; Seidler, Mark; Witle, Joseph W., deceased; Witte, Margarethe H., heir; Witte, Karin, heir; and Witte, Klaus G., heir, 4,988,774, Cl. 525-340.000.
Findeisen, Kurt; Jelich, Klaus; and Hanssler, Gerd, 4,988,718, Cl. 514-363.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,378, Cl. 71-90.000.
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Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, 4,988,748, Cl. 524-141.000.
Hamprecht, Rainer; Kressner, Michael; and Pape, Georg, 4,988,752, Cl. 524-190.000.
Heidenreich, Holger; Wolfrum, Gerhard; Wehling, Klaus; and Hugl, Herbert, 4,988,616, Cl. 435-4.000.
Henkel, Hanno; Rudolph, Karl-Heinz; Sahlmen, Friedhelm; and Brockmann, Rolf, 4,988,234, Cl. 405-36.000.
Jager, Gerhard; Kraatz, Udo; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 4,988,383, Cl. 71-92.000.
Kaulen, Johannes, 4,988,823, Cl. 549-14.000.
Kraatz, Udo; and Hanssler, Gerd, 4,988,734, Cl. 514-624.000.
Kramer, Wolfgang; Weissmuller, Joachim; Holmwood, Graham; Berg, Dieter; Dutzmann, Stefan; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,988,729, Cl. 514-452.000.
Kunde, Klaus, 4,988,805, Cl. 534-717.000.
Lindel, Hans; Hallenbach, Werner; Berschauer, Friedrich; Klotz, Gernot; and Greife, Heinrich A., 4,988,694, Cl. 514-235.500.
Meyer, Rolf-Volker; Fahnler, Friedrich; Muller, Hanns-Peter; Wandel, Martin; and Heinz, Hans-Detlef, 4,988,549, Cl. 428-35.700.
Mitschker, Alfred; Lange, Peter M.; Heller, Harold; Werner, Friedrich; Soest, Hans-Karl; and Siegers, Gunter, 4,988,738, Cl. 521-30.000.
Mormann, Werner; and Schmalz, Kerstin, 4,988,787, Cl. 526-262.000.
Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.
Stohr, Frank M.; Henk, Hermann; and Herd, Karl-Josef, 4,988,803, Cl. 534-635.000.
Wagner, Klaus; and Hanssler, Gerd, 4,988,719, Cl. 514-369.000.
Walz, Klaus; and Breyer, Karl-Heinz, 4,988,463, Cl. 252-358.000.
Wehinger, Egbert; Meyer, Horst; Bosseret, Friedrich; Vater, Wulf; Towart, Robertson; Stoepel, Kurt; and Kazda, Stanislav, 4,988,717, Cl. 514-356.000.
Wiederhoft, Gerhard; Bayer, Eckhard; Muller, Wolfgang D.; and Lailach, Gunter, 4,988,495, Cl. 423-616.000.

Bayer Aktiengesellschaft: *See*—
Fiedler, Paul; Littmann, Martin; Lenthe, Manfred; Noak, Achim; and Siekmann, Gerd, 4,988,829, Cl. 549-519.000.

Bayer, Eckhard: *See*—
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Bayer, Matthew: *See*—
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Beal, David E.; Dumont, John W., Jr.; and Matthews, Andrew S., to Dumont Holding Company. Apparatus for use in dehumidifying and otherwise conditioning air within a room. 4,987,952, Cl. 165-16.000.
Bearden, Roby, Jr.: *See*—
Aldridge, Clyde L.; Bearden, Roby, Jr.; and Riley, Kenneth L., 4,988,434, Cl. 208-251.00H.
Beasley, Bob L. Aquatic exercise apparatus. 4,988,094, Cl. 272-116.000.
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Lazzara, Richard J.; and Beaty, Keith D., 4,988,298, Cl. 433-173.000.
Beck, Fritz; Krohn, Holger; Wagner, Rainer; and Nann, Eberhard, to Hagen Batterie AG. Method of electrically measuring the concentration of acids. 4,988,418, Cl. 204-153.100.
Beck, Fritz: *See*—
Batzill, Wolfgang; Heilmann, Ulrich; Streitberger, Hans J.; Guder, Harald; and Beck, Fritz, 4,988,420, Cl. 204-181.100.
Beecham Group P.L.C.: *See*—
Cawthorne, Michael A., 4,988,720, Cl. 514-377.000.
Hadley, Michael S.; Orlek, Barry S.; Wyman, Paul A.; and Wadsworth, Harry J., 4,988,706, Cl. 514-299.000.
Beers, Howard L., to HF Scientific, Inc. Comparative temperature compensating specific gravity test apparatus. 4,987,778, Cl. 73-449.000.
Begin, John D.; Berry, James E.; and Kretzmer, Paul D., to GTE Valenite Corporation. Intelligent power monitor. 4,989,155, Cl. 364-483.000.
Behn, Rudolf; Bohmer, Branislav; Hoppe, Lutz; and Szablikowski, Klaus, to Wolff Walsrode AG. Substances for the manufacture of paper. 4,988,790, Cl. 524-514.000.
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Beltz, Dale L., to Ford Motor Company. Optical occupant restraint activation sensor. 4,988,862, Cl. 250-227.150.
Benavidez, Cande. Combination ruler and cutter guide. 4,987,812, Cl. 83-455.000.
Bene, Pierre-Yves. Device for cleaning and disinfecting medical and surgical instruments. 4,988,485, Cl. 422-292.000.
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Benelli, Giancarlo; Carenzi, Angelo; Chiarino, Dario; and Fantucci, Mario, to Zambon Group S.p.A. Isoxazole containing compounds exhibiting anti-serotonin activity. 4,988,691, Cl. 514-214.000.
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Bennett, Christopher J., to General Instrument Corporation. Controlled authorization of descrambling of scrambled programs broadcast between different jurisdictions. 4,989,245, Cl. 380-23.000.
Bennett, Robert E., to Deere & Company. Concave grid inserts. 4,988,326, Cl. 460-110.000.
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Beran, Debra L.; Cann, Kevin J.; Jorgensen, Robert J.; Karol, Frederick J.; Maraschin, Norma J.; and Marcinkowsky, Arthur E., to Union Carbide Chemicals and Plastics Company Inc. Ethylene polymerization using supported vanadium catalyst. 4,988,783, Cl. 526-129.000.
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Berg, Dieter: *See*—
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Bergqvist, Jan-Ove; and Andersson, Jarl, to Alfa-Laval Thermal AB. Permanently joined plate heat exchanger. 4,987,955, Cl. 165-167.000.
Bergstein, Paul L.; and Subramanyam, Vinayakam, to Du Pont de Nemours, E. I., and Company. Ether isonitriles and radiolabeled complexes thereof. 4,988,827, Cl. 549-451.000.
Bernard, Robin D.; Gardner, John G.; and Ueki, Jun, to Filtercorp, Inc. Cooking oil filter. 4,988,440, Cl. 210-504.000.
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Calabrese, Peter A. Cue tippers. 4,987,936, Cl. 144-346.000.
Caledonian Mining Co., Ltd.: *See*—
Mason, Benjamin, 4,988,232, Cl. 403-403.000.
Calhoun, George W., to Roadway Express, Inc. Tariff rating system. 4,988,125, Cl. 283-67.000.
California Institute of Technology: *See*—
Landegren, Ulf; and Hood, Leroy, 4,988,617, Cl. 435-6.000.
Camarota, Richard J., to ITC, Incorporated. Ski tow fixture. 4,987,845, Cl. 114-253.000.
Cameron, William D.: *See*—
Ramsey, Boyd J.; and Cameron, William D., 4,988,236, Cl. 405-157.000.
Camp Dresser & McKee: *See*—
Meckler, Gershon, 4,987,748, Cl. 62-176.100.
Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., to Faroudja, Yves C. Television scan line doubler including temporal median filter. 4,989,090, Cl. 358-140.000.

Campbell, Kenneth D., to Union Carbide Chemicals and Plastics Company Inc. Double perovskite catalysts for oxidative coupling. 4,988,660, Cl. 502-303.000.

Canada, Her Majesty in Right of, as represented by the Minister of National Defence: *See*—
Coffey, Clayton G.; Jones, William A.; and Friend, William H., 4,989,007, Cl. 342-11.000.

Cann, Kevin J.: *See*—
Beran, Debra L.; Cann, Kevin J.; Jorgensen, Robert J.; Karol, Frederick J.; Maraschin, Norma J.; and Marcinkowsky, Arthur E., 4,988,783, Cl. 526-129.000.

Canon Kabushiki Kaisha: *See*—
Aoi, Shigeru, 4,989,194, Cl. 369-44.270.
Arimoto, Shinobu, 4,989,098, Cl. 358-455.000.
Hayashi, Kimiyoshi; Suda, Kenichi; and Hirooka, Kazuhiko, 4,989,039, Cl. 355-208.000.
Horiuchi, Akihisa; and Hamano, Hiroyuki, 4,988,174, Cl. 350-427.000.
Matsumura, Koichi; and Yoshihara, Akira, 4,989,025, Cl. 354-106.000.
Muramatsu, Masanori; and Sugiura, Takashi, 4,989,042, Cl. 355-244.000.
Nishimura, Katsuhiko; Yamazaki, Michihito; Okano, Keiji; Katoh, Motoi; Suwa, Kouichi; Sato, Yasushi; and Nakahata, Kimio, 4,989,044, Cl. 355-251.000.
Ochiai, Toshihiko; and Ando, Yujiro, 4,989,021, Cl. 346-160.100.
Ohta, Masakatsu, 4,988,188, Cl. 353-122.000.
Owada, Mitsuru; Tajima, Mizuho; and Nagashima, Yoshitake, 4,989,076, Cl. 358-61.000.
Takai, Hideyuki, 4,988,593, Cl. 430-58.000.
Uehara, Tsukasa, 4,989,106, Cl. 360-99.020.
Usui, Yoshiko, 4,989,060, Cl. 357-30.000.

Cantrell, Ronald J.; Klomp, Edward D.; Groff, Edward G.; Solomon, James G.; and Gorman, Michael J., to General Motors Corporation. Two cycle engine with valved pressure scavenging. 4,987,864, Cl. 123-65.0BA.

Cantwell, Hugh F., to Rolls-Royce plc. Fuel control system for gas turbine aeroengine overspeed protection. 4,987,737, Cl. 60-39.281.

Capaldi-Tallon, Alan: *See*—
Payne, Roger D.; and Capaldi-Tallon, Alan, 4,988,977, Cl. 340-524.000.

Caprathe, Bradley W.; Jaen, Juan C.; and Wise, Lawrence D., to Warner-Lambert Company. Substituted tetrahydrobenzothiazoles as dopaminergic agents. 4,988,699, Cl. 514-254.000.

Carco Electronics: *See*—
Schneider, Rudy L., 4,988,936, Cl. 318-632.000.

Carenzi, Angelo: *See*—
Benelli, Giancarlo; Carenzi, Angelo; Chiarino, Dario; and Fantucci, Mario, 4,988,691, Cl. 514-214.000.

Carfax, Inc.: *See*—
Barnett, Ewin H., III, 4,989,144, Cl. 364-419.000.

Carlingswitch, Inc.: *See*—
Sorenson, Richard W., 4,989,118, Cl. 361-376.000.

Carlson, Dale R.: *See*—
Lauer, Manfred; Zipplies, Matthias; Sauter, Hubert; Moore, Barbara A.; Carlson, Dale R.; Zorner, Paul S.; Westphalen, Karl-Otto; and Wuerzer, Bruno, 4,988,818, Cl. 548-267.400.

Carr, Robin A. E.; and Powell, Lyn, to Imperial Chemical Industries PLC. Process for intermediates for insecticidal compounds. 4,988,826, Cl. 549-445.000.

Carroll Touch, Incorporated: *See*—
Wehrer, Wayne J., 4,988,983, Cl. 340-712.000.

Carson, Ian G.; and Bentvelsen, Petrus A., to Shell Internationale Research Maatschappij, B.V. Alkene polymerization process and catalyst compositions therefor. 4,988,782, Cl. 526-125.000.

Carson, Steven R.; Griffin, Raymond T.; and Spear, Scott A., to Lightolier, Inc. Control switch. 4,988,840, Cl. 200-334.000.

Cartensen, Kenneth J. Threaded tubing and casing joint. 4,988,127, Cl. 285-94.000.

Carter, Peter: *See*—
Bristow, Neil J.; Carter, Peter; Coulson, Bryony E.; and Trevethan, Michael A., 4,988,499, Cl. 424-52.000.

Carter, Thomas S.: *See*—
Wingrave, James A.; Carter, Thomas S.; and Palmer, Charles F., Jr., 4,988,450, Cl. 252-8.514.

Casagrande, Cesare; Santangelo, Francesco; and Calabi, Maria L., to Simes. Ethylene diamine active cardiovascular therapy. 4,988,735, Cl. 514-648.000.

Cash, Richard, Sr., to Sterns Metals Inc. Individually variable multi-station drawing apparatus. 4,987,762, Cl. 72-349.000.

Casse, Pierre; and Bochot, Jean-Claude, to Valeo. Torque transmission with a hydraulic coupling unit and locking clutch. 4,987,981, Cl. 192-3.290.

Castlebury, Gerald E. Fuse holder device. 4,988,313, Cl. 439-621.000.

Catalysts and Chemicals Inc., Far East: *See*—
Arai, Hiromichi; Kitagawa, Jun; and Nishioka, Yasuo, 4,988,661, Cl. 502-327.000.

Caterpillar Inc.: *See*—
Lammers, Bryan G., 4,988,329, Cl. 475-337.000.
Richardson, Ronald D., 4,987,868, Cl. 123-260.000.

Cawthorne, Michael A., to Beecham Group P.L.C. Novel treatment of hyperglycaemia. 4,988,720, Cl. 514-377.000.

Cegedur Pechiney Rhenalu: *See*—
Rebreyend, Catherine, 4,988,401, Cl. 156-326.000.

Cel-Franc Inc.: *See*—
Charest, Gerald, 4,987,943, Cl. 160-269.000.

Cella, James A.; and Grade, Marsha M., to General Electric Company. Bisphenol-A dianhydride-based polyimide matrix resins and method of preparation. 4,988,544, Cl. 427-384.000.

Ceskoslovenska akademie ved: *See*—
Wichterle, Otto; and Wichterle, Ivan, 4,988,277, Cl. 425-435.000.

Chaczyk, Adam W., to Babcock Industries, Inc. Sealed protective boot for movable shafts. 4,988,113, Cl. 277-212.0FB.

Chaczyk, Adam W.: *See*—
Baumgarten, John M.; and Chaczyk, Adam W., 4,987,793, Cl. 74-502.000.

Chakravorty, Kishore K.; and Lathrop, Lane S., to Boeing Company, The. Reducing plating anomalies in electroplated fine geometry conductive features. 4,988,413, Cl. 204-15.000.

Chamberlain Group, Inc., The: *See*—
Borja, Jesus, 4,988,965, Cl. 335-205.000.
Heitschel, Carl T.; and Reich, Paul W., 4,988,992, Cl. 340-825.690.

Chambers, John G.; Instone, Terry; and Joy, Brian S., to Lever Brothers Company, Division of Conopco, Inc. Transparent soap bar containing a monohydric and dihydric alcohol. 4,988,453, Cl. 252-122.000.

Chambers, Scott R.; and Croce, Michael R., to Witco Corporation. Halogenated vinyl polymer composition and method for stabilizing halogenated vinyl polymer composition containing smoke retardants. 4,988,751, Cl. 524-181.000.

Chandler, Maurice P.; and Fylan, Michael S., to General Motors Corporation. Transparent upper door frame. 4,988,142, Cl. 296-146.000.

Chandra, Suresh; and Daunt, Geraldine H., to United States of America, Army. Double conjugate laser amplifier. 4,989,216, Cl. 372-97.000.

Chang, David, to Micropolis Corporation. Electro-mechanical latch. 4,989,108, Cl. 360-105.000.

Chang, Stanley S., to Hughes Aircraft Company. Unfurlable mesh reflector. 4,989,015, Cl. 343-915.000.

Chang, Wen-Hsuan; and Erikson, J. Alden, to PPG Industries, Inc. Polyamine-functional silane resin. 4,988,778, Cl. 525-476.000.

Chantelou, Olivier; and Lhuillier, Jean-Jacques, to U.S. Philips Corporation. Television picture coding device and corresponding decoding device, a television picture transmission system incorporating such devices, and transmission and receiving stages of such a system. 4,989,089, Cl. 358-136.000.

Charbonneau, Jack W., to Minnesota Mining and Manufacturing Company. Fragrance sampling device. 4,988,557, Cl. 428-204.000.

Charest, Gerald, to Cel-Franc Inc. Wedging assembly for sealing an edge of a window shade. 4,987,943, Cl. 160-269.000.

Charles Winn (Valves) Limited: *See*—
Burton, Philip J., 4,988,076, Cl. 251-306.000.

Chatterjee, Sugata: *See*—
Franco, Christopher M. M.; Gandhi, Julia; Chatterjee, Sugata; Reddy, Goukanapalli C. S.; Ganguli, Bimal N.; Rupp, Richard H.; Kogler, Herbert; and Fehlhaber, Hans-Wolfram, 4,988,677, Cl. 514-30.000.

Chavkin, Leonard; and Mackles, Leonard. Liquid sustained release composition. 4,988,679, Cl. 514-53.000.

Chen, Chin-Pei. Method for manufacturing a seat post of a bicycle. 4,987,764, Cl. 72-367.000.

Chen, Fang-Chung; and Franklin, Michael L., to Hoffmann-La Roche Inc. Multiple beam laser instrument for measuring agglutination reactions. 4,988,630, Cl. 436-533.000.

Chen, Stanley. Memory dial telephone finder. 4,989,241, Cl. 379-357.000.

Chen, Tu: *See*—
Yamashita, Tsutomu T.; Shir, Ching-Cheng; and Chen, Tu, 4,988,578, Cl. 428-678.000.

Cheng, Duen-Jen: *See*—
Chi, Guey-Fa; Cheng, Duen-Jen; and Yeh, Ying-Cheun, 4,987,879, Cl. 123-617.000.

Cheng, Koun-Ping. Method of finding the surface intersections and the shortest distance between two aribtrary surfaces. 4,989,152, Cl. 364-474.240.

Cheng, Ming S. Geometric puzzle of spheres. 4,988,103, Cl. 273-157.00R.

Chern, Shyh Y. Power wrench. 4,987,802, Cl. 81-57.390.

Chern, Shyh Y. Power wrench. 4,987,803, Cl. 81-57.390.

Chesapeake Fiber Packaging Corporation: *See*—
Seitz, Joel, 4,988,022, Cl. 223-98.000.

Chesley F. Carlson Company: *See*—
Hull, Frank A.; and Archer, H. Brent, 4,989,032, Cl. 355-38.000.

Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz. Data string compression using arithmetic encoding with simplified probability subinterval estimation. 4,989,000, Cl. 341-107.000.

Chevron Research Company: *See*—
Kennedy, James V.; and Jossens, Lawrence W., 4,988,654, Cl. 502-84.000.
Pecoraro, Theresa A., 4,988,659, Cl. 502-235.000.
Reynolds, John G.; and Kramer, David C., 4,988,433, Cl. 208-251.00R.

Chi, Guey-Fa; Cheng, Duen-Jen; and Yeh, Ying-Cheun, to Industrial Technology Research Institute. Ignition distributor having a magnetic pick-up device including a magnetoresistor. 4,987,879, Cl. 123-617.000.

Chiang, Anne: *See*—
Huang, Tiao-Yuan; Chiang, Anne; and Wu, I-Wei, 4,988,638, Cl. 437-57.000.

Chiarino, Dario: *See*—
Benelli, Giancarlo; Carenzi, Angelo; Chiarino, Dario; and Fantucci, Mario, 4,988,691, Cl. 514-214.000.

Chiarot, John B. Modular ski rack and mounting kit. 4,988,007, Cl. 211-70.500.

Chicago Bridge & Iron Technical Services Company: *See*—
Andrepont, John S.; Wozniak, Robert S.; and Saint, Chapin O., 4,987,922, Cl. 137-592.000.

Chicago Metallic Corporation: *See*—
Dunn, James J., 4,987,715, Cl. 52-489.000.

Chikama, Makoto: *See*—
Nishimura, Tatsuo; Chikama, Makoto; and Ogiwara, Koichi, 4,987,765, Cl. 72-405.000.

Chin, Arthur A., to Mobil Oil Corporation. Reducing NO_x emissions with antimony additive. 4,988,432, Cl. 208-121.000.

Ching-Yuan, Yeh. Brush with extendible and retractable bristle elements. 4,988,228, Cl. 401-289.000.

Chinoin Gyogyszer es Vegyeszeti Termekek Gyar RT: *See*—
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara, R. T.: *See*—
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Chistoserdov, Andrei J.: *See*—
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

Cho, Alex, to Aluminum Company of America. Method of producing unrecrystallized thin gauge aluminum products by heat treating and further working. 4,988,394, Cl. 148-12.70A.

Chobotov, Michael V., to HAC. Propellant measurement system. 4,987,775, Cl. 73-149.000.

Chodelka, David E.: *See*—
Boris, Leonard D.; and Chodelka, David E., 4,989,175, Cl. 364-900.000.

Choi, Choon-Kun, to SamSung Electronics Co., Ltd. Automatic compensation system of transmission level in MODEM. 4,989,243, Cl. 379-402.000.

Choi, Dong Sok. Therapeutic warming bag, an apparatus for its manufacture, and method for manufacturing a needle punched fabric of the bag. 4,988,053, Cl. 242-56.800.

Chomerics, Inc.: *See*—
Keyser, Paul; Jones, Peter; and Hubbard, John D., 4,988,550, Cl. 428-40.000.

Choquet, Bruno: *See*—
Pele, Daniele; and Choquet, Bruno, 4,989,087, Cl. 358-136.000.

Chow, Marland: *See*—
Smith, Robert W.; McIntyre, John J.; and Chow, Marland, 4,988,097, Cl. 272-119.000.

Christensen, Stephen B.; Schulz, Gary J.; and Kling, Susan, to Dow Chemical Company, The. Removal of undesirable material from water-soluble polysaccharide ethers. 4,988,807, Cl. 536-127.000.

Christiansen, Paul J.; and Foster, David A., to General Motors Corporation. Servicable wheel speed sensor assembly. 4,988,220, Cl. 384-448.000.

Chrysler Corporation: *See*—
Wicks, Thomas, 4,987,979, Cl. 188-250.00E.

Chu, Albert M., to International Business Machines Corporation. High speed CMOS latch without pass-gates. 4,988,896, Cl. 307-452.000.

Chu, Wah C.: *See*—
Lyons, Richard J.; Nolan, Kevin F.; and Chu, Wah C., 4,989,141, Cl. 364-408.000.

Church, Gerald H.: *See*—
Cain, Gary L.; Sobottke, Mark D.; Church, Gerald H.; and Zalusky, James T., 4,988,193, Cl. 356-152.000.

Cianciulli, Michael A.: *See*—
Cianciulli, Vito; and Cianciulli, Michael A., 4,987,731, Cl. 56-17.500.

Cianciulli, Vito; and Cianciulli, Michael A. Leaf rake attachment. 4,987,731, Cl. 56-17.500.

Ciba-Geigy Corporation: *See*—
Froesch, Ernst R.; Guler, Hans-Peter; Schmid, Christoph; and Zapf, Jurgen, 4,988,675, Cl. 514-4.000.
Langfeld, Horst, 4,988,804, Cl. 534-684.000.
McCracken, Alan, 4,987,850, Cl. 118-303.000.

Cincinnati Milacron Inc.: *See*—
Faig, Harold J.; and Sparer, Ronald M., 4,988,273, Cl. 425-145.000.

Ciokajlo, John J.; and Vogt, Daniel S., to General Electric Company. Lightweight gas turbine engine frame with free-floating heat shield. 4,987,736, Cl. 60-39.310.

Citizen Watch Co., Ltd.: *See*—
Yamamoto, Tetsuya; Moriya, Takashi; and Tai, Yoshimasa, 4,988,222, Cl. 400-124.000.

Clark Equipment Company: *See*—
Kaczmarski, Wally L.; Watts, Verne W.; Loraas, Orlan J.; Vosberg, Curtis W.; and Mather, Joseph M., 4,987,689, Cl. 37-195.000.

Clark, Ian S. R.: *See*—
Oenning, James B.; and Clark, Ian S. R., 4,988,386, Cl. 75-247.000.

Clarke, James R.: *See*—
Meckstroth, Richard J.; and Clarke, James R., 4,987,985, Cl. 192-58.00A.

Clausen-Schaumann, Andreas, to Bayerische Motoren Werke AG. Process for mounting a tiltable cover on a vehicle roof. 4,987,671, Cl. 29-434.000.

Clear, Sandra H.: *See*—
Reising, George S.; Bergman, Bruce H.; Clear, Sandra H.; Guinn, Susan E.; and Gomez-Santiago, Rolando, 4,988,344, Cl. 604-368.000.

Clemence, Francois; Le Martret, Odile; and Delevallee, Francoise , to Roussel Uclaf. Analgesic and anti-inflammatory 4-OH quinoline carboxylic acid derivatives. 4,988,708, Cl. 514-312.000.

Clemence, Francois; and Fortin, Michel, to Roussel Uclaf. N-(aminoindanyl)amides as analgesics and antiarrhythmics. 4,988,727, Cl. 514-422.000.

Clemence, Francois; Fortin, Michel; Le Martret, Odile; and Delevallee, Francoise, to Roussel Uclaf. Novel hydroquinolines useful as intermediates. 4,988,810, Cl. 544-128.000.

Clement, Gene R., to Knape & Vogt Manufacturing. Sequential drawer slide. 4,988,214, Cl. 384-18.000.

Clement, Heinz, to Rieter Machine Works, Ltd. Combing machine with workstations having a monitoring unit at each workstation. 4,987,648, Cl. 19-115.00R.

Cliffe, Ian A.: *See*—
Abou-Gharbia, Magid A.; Yardley, John P.; and Cliffe, Ian A., 4,988,814, Cl. 544-295.000.

Clifton, Michael D.; and Geibel, Jon F., to Phillips Petroleum Company. Process for preparing poly(arylene sulfide sulfone). 4,988,796, Cl. 528-388.000.

Clomburg, Lloyd A., Jr.: *See*—
Crenwelg, Otto E., Jr.; and Clomburg, Lloyd A., Jr., 4,988,368, Cl. 48-210.000.

Cobb, Bernard A., to United States of America, Army. Mounting means for use of ground system type goggles as aviators goggle. 4,987,608, Cl. 2-6.000.

Cobb, Sanford, Jr.; and Miller, Richard A., to Minnesota Mining and Manufacturing Company. Reflector using fresnel-type structures having a plurality of active faces. 4,989,125, Cl. 362-346.000.

Codex Corporation: *See*—
Qureshi, Shahid U. H.; and Ling, Fuyun, 4,989,221, Cl. 375-8.000.

Cody, Ralph F. Automobile servicing system. 4,987,973, Cl. 184-1.500.

Coe, Everett L., Jr.: *See*—
Krigmont, Henry V.; and Coe, Everett L., Jr., 4,987,839, Cl. 110-216.000.

Coffey, Clayton G.; Jones, William A.; and Friend, William H., to Canada, Her Majesty in Right of, as represented by the Minister of National Defence. Passive radar augmented projectile (PRAP). 4,989,007, Cl. 342-11.000.

Cogema: *See*—
Guironnet, Louis, 4,988,475, Cl. 376-248.000.

Cohen, Kenneth A.: *See*—
Ounanian, Hovig O.; Cohen, Kenneth A.; DiSomma, Joseph; and Gedeon, Harvey, 4,988,502, Cl. 424-63.000.

Cohen, Martin G.; Kern, William I.; and Trokel, Stephen, to Quantronix Corp. Infrared laser system for surgical purposes employing compound fiber probe. 4,988,163, Cl. 350-96.290.

Cohen-Sabban, Yael L., to Israel Aircraft Industries, Ltd. Apparatus for automatic tracking and contour measurement. 4,988,200, Cl. 356-376.000.

Colak, Sel; and Rumennik, Valdimir, to North American Philips Corp. Fast switching lateral insulated gate transistors. 4,989,058, Cl. 357-23.800.

Cole, Herbert S.: *See*—
Liu, Yung S.; Cole, Herbert S.; Guida, Renato; and Rose, James W., 4,988,412, Cl. 204-15.000.

Cole, Larry. Aquarium filtration system with liquid distributor and protein skimmer. 4,988,436, Cl. 210-169.000.

Coleman, John R., to General Motors Corporation. Master cylinder with collapsible piston locator. 4,987,739, Cl. 60-562.000.

Coleman, John R., to General Motors Corporation. Assured venting master cylinder diaphragm apparatus and method. 4,987,740, Cl. 60-583.000.

Colin Electronics Co., Ltd.: *See*—
Eckerle, Joseph S.; and Winter, Dean C., 4,987,900, Cl. 128-672.000.

Colligan, Kevin J., to Boeing Company, The. Cutter with angled diamond inserts. 4,988,241, Cl. 407-51.000.

Collins & Aikman Floor Coverings Corporation: *See*—
Zegler, Stephen A., 4,988,551, Cl. 428-40.000.

Collins, Paul R.; and Rothrock, Larry R., to Union Carbide Chemicals and Plastics Company Inc. Toughness coating for crystalline orthodontic brackets. 4,988,293, Cl. 433-8.000.

Coloplast A/S: *See*—
Ballan, Akeel, 4,988,343, Cl. 604-332.000.

Colorocs Corporation: *See*—
Slayton, Danny L.; Tompkins, E. Neal; Lak, Khosrow; and Palm, Charles S., 4,989,045, Cl. 355-260.000.

Columbus, Richard L.; and Kissel, Thomas R., to Eastman Kodak Company. Sterilizing dressing device and method for skin puncture. 4,988,341, Cl. 604-306.000.

Comet Industries: *See*—
Rankin, James; and Miller, Jack V., 4,988,320, Cl. 446-62.000.

Commissariat a l'Energie Atomique: *See*—
Francois, Bernard; Navizet, Monique; Rebreyend, Jean-Claude; and Wyon, Christophe, 4,988,882, Cl. 250-483.100.

Commodore Business Machines, Inc.: *See—*
Gardei, William F., 4,989,174, Cl. 364-786.000.
Composite Concepts Company: *See—*
Tomalin, Dandridge S., 4,988,552, Cl. 428-677.000.
Comprino, B.V.: *See—*
Lagas, Jan A.; Borsboom, Johannes; Berben, Pieter H.; and Geus, John W., 4,988,494, Cl. 423-574.00R.
Concannon, Thomas P.: *See—*
Bragaw, Chester G., Jr.; Concannon, Thomas P.; and Davis, Robert F., 4,988,540, Cl. 427-155.000.
Concept, Inc.: *See—*
Paulos, Leon E.; Rosenberg, Thomas D.; and Ross, Randall D., 4,988,351, Cl. 606-72.000.
Concepta Print AG: *See—*
Weder, Kurt, 4,987,831, Cl. 101-350.000.
Conley, Richard W.; and Tremblay, Richard P., to Kerotest Manufacturing Corp. Reinforced plastic valve. 4,988,077, Cl. 251-309.000.
Conoco Inc.: *See—*
Adney, Billy R.; Alworth, Charles W.; Durkee, John B.; and Jeffries, Bryce T., 4,987,914, Cl. 137-8.000.
Consiglieri, Franco: *See—*
Storti, Sandro; Murari, Bruno; and Consiglieri, Franco, 4,989,114, Cl. 361-84.000.
Cook Pacemaker Corporation: *See—*
Goode, Louis; and Shipko, Frederick J., 4,988,347, Cl. 606-1.000.
Cook, Paul J., to Samuelson Group plc. Sighting arrangements. 4,988,166, Cl. 350-321.000.
Cook, Russell P. Fish hook construction. 4,987,696, Cl. 43-43.160.
Coonrod, Ralph E. Golfer's putting device. 4,988,106, Cl. 273-176.00F.
Cooper Industries, Inc.: *See—*
Gurevich, Leon, 4,988,969, Cl. 337-260.000.
Cooper, John E., to JE Hanger & Company Limited. Turntable for artificial limb. 4,988,361, Cl. 623-38.000.
Cooper Union Research Foundation, Inc.: *See—*
Bove, John L., 4,988,825, Cl. 549-272.000.
Copal Co. Ltd.: *See—*
Ito, Yukihiro; Kimura, Takashi; and Hoshika, Reiji, 4,988,938, Cl. 318-696.000.
Copeland Corporation: *See—*
Blass, Jaroslav, 4,988,269, Cl. 417-312.000.
Coraluppi, Enzo: *See—*
Valbusa, Luigi; Coraluppi, Enzo; Quaglia, Andrea; and Tavella, Mario, 4,988,811, Cl. 544-207.000.
Corbett, William D., to Brunswick Corporation. Evaporable foam pattern assembly for casting a centrifugal pump housing. 4,987,945, Cl. 164-235.000.
Corbiere, Jerome. New pharmaceutical compositions for the buccal tract and process for their preparation. 4,988,683, Cl. 514-165.000.
Corcoran, Sean P.; Dixon, Thomas E.; Farmer, Stanley; Hungerford, Emory D.; and Mallory, Mark, to Esco Corporation. BI-directional tree saw. 4,987,935, Cl. 144-34.00R.
Coriolis Corporation: *See—*
Iversen, Arthur H.; and Whitaker, Stephan, 4,989,070, Cl. 357-82.000.
Cornell, William D.; Rexrode, Donald E.; Wolfe, Delmer B.; and Remy, Nicholas D., to Bethleham Steel Corporation. Electrical flash butt welding apparatus. 4,988,843, Cl. 219-100.000.
Coronet-Werke Heinrich Schlerf GmbH: *See—*
Weihrauch, Georg, 4,987,634, Cl. 15-209.00R.
Weihrauch, Georg, 4,988,146, Cl. 300-21.000.
Corporate Class Software: *See—*
Lyons, Richard J.; Nolan, Kevin F.; and Chu, Wah C., 4,989,141, Cl. 364-408.000.
Corrigan, Colin D.; Haley, Lawrence V.; and Menagh, Douglas P., to Research Corporation Technologies, Inc. Exposive detection screening system. 4,987,767, Cl. 73-23.360.
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Janson, Juergen; Gruber, Otto-Heinz; and Cosaert, Roland, 4,988,060, Cl. 244-173.000.
Cotterill, Michael J. Selectively controlled keyboard support. 4,988,066, Cl. 248-281.100.
Couche, Charles A., to Physio-Control Corporation. Apparatus for transmitting patient physiological signals. 4,987,902, Cl. 128-696.000.
Coucher, Robert G., to Custom Equipment Corporation. Reaction furnace. 4,988,289, Cl. 432-103.000.
Coulson, Bryony E.: *See—*
Bristow, Neil J.; Carter, Peter; Coulson, Bryony E.; and Trevethan, Michael A., 4,988,499, Cl. 424-52.000.
Cox, David A., to GTE Products Corporation. Hooked electrode for arc lamp. 4,988,917, Cl. 313-631.000.
Crawford, Carl R., to General Electric Company. Three-dimensional images obtained from tomographic slices with gantry tilt. 4,989,142, Cl. 364-413.150.
Crawshaw, Geoffrey K. Soil gas reduction system. 4,988,237, Cl. 405-229.000.
Crenweig, Otto E., Jr.; and Clomburg, Lloyd A., Jr., to Shell Oil Company. Method for determination of slag tap blockage. 4,988,368, Cl. 48-210.000.
Crevoulin, Roland; Ambos, Rene ; and Bonnier, Jean-Jo e/ l, to Thomson CSF. Method and device for identical processing of several simultaneous analog signals of short duration and tracking radar using this device. 4,989,010, Cl. 342-150.000.
Cristiani, Marcello, to Weber S.r.l. Excitation coil for a fuel injection metering and atomizing valve on an internal combustion engine. 4,988,073, Cl. 251-129.010.
Criswell, Peter B., to Unisys Coporation. Apparatus and method for checking start signals. 4,989,172, Cl. 364-737.000.
Critikon, Inc.: *See—*
Ramsey, Maynard, III, 4,988,229, Cl. 402-4.000.
Crittenden, James F.; Barbere, Michael D.; and White, Bryan J., to C. R. Bard, Inc. Catheter and guidewire exchange system. 4,988,356, Cl. 606-192.000.
Croce, Michael R.: *See—*
Chambers, Scott R.; and Croce, Michael R., 4,988,751, Cl. 524-181.000.
Crosfield Electronics Limited: *See—*
Webb, Graham; and Kirk, Richard A., 4,989,096, Cl. 358-298.000.
Crouch, Donald G., to Saturn Corporation. Device to assist with the radial distribution of lubricating fluid from a rotating shaft. 4,987,974, Cl. 184-6.120.
Crowell Corporation, The: *See—*
Raszewski, Lewis R.; and Kipnees, Jerome J., 4,987,997, Cl. 206-328.000.
Crystal Semiconductor Corporation: *See—*
Stern, Kenneth J.; and Bily, Stephen F., 4,988,954, Cl. 330-264.000.
Cunningham, Terence P.: *See—*
Bettridge, David F.; Cunningham, Terence P.; and Forman, Brian W., 4,988,575, Cl. 428-469.000.
Cur, Nihat O.; Pastryk, Jim J.; Hardaway, Anthony H.; and Euler, John W., to Whirlpool Corporation. High performance washing process for vertical axis automatic washer. 4,987,627, Cl. 8-158.000.
Curtin, John H.: *See—*
Hey, H. Peter W.; Mazak, William A.; Aggarwal, Ravinder K.; and Curtin, John H., 4,987,856, Cl. 118-723.000.
Curtis, Stanley E.; and Taylor, Ian A., to University of Illinois, The Board of Trustees of the. Animal feeding device. 4,987,858, Cl. 119-54.000.
Custom Equipment Corporation: *See—*
Coucher, Robert G., 4,988,289, Cl. 432-103.000.
Dahlin, Ingemar; and Lagerqvist, Roger, to Norba AB. Device for handling refuse. 4,988,257, Cl. 414-420.000.
Dahm, Gerhard: *See—*
Klink, Paul; Wichmann, Gunter; and Dahm, Gerhard, 4,987,832, Cl. 102-213.000.
Dai Nippon Toryo Co., Ltd.: *See—*
Sakai, Tomoharu; Yoshida, Eizo; Mihara, Hiroshi; and Adachi, Toshio, 4,987,852, Cl. 118-603.000.
Daido Metals Company Ltd.: *See—*
Iijima, Yoshio, 4,988,217, Cl. 384-273.000.
Daikin Industries, Ltd.: *See—*
Ohyama, Kazunobu; and Yamai, Hiroyuki, 4,989,128, Cl. 363-41.000.
Toyoda, Hideyoshi; and Utsumi, Ryutaro, 4,988,586, Cl. 424-93.000.
Daimler-Benz AG: *See—*
Hilburger, Walter, 4,987,869, Cl. 123-323.000.
Schenk, Jurgen, 4,987,873, Cl. 123-418.000.
Dainippon Ink and Chemicals, Inc.: *See—*
Tsuchiya, Kikuo; Inagaki, Masaji; and Araki, Shingo, 4,988,662, Cl. 503-208.000.
Dainippon Screen Mfg. Co., Ltd.: *See—*
Kondo, Noriyuki, 4,988,198, Cl. 356-357.000.
Sugimoto, Kenji, 4,987,687, Cl. 34-58.000.
Daishowa Chemicals Inc.: *See—*
Lin, Stephen Y.; and Bushar, Lori L., 4,988,576, Cl. 428-537.100.
Samson, Russell H.; and Hollis, John W., Jr., 4,988,799, Cl. 530-505.000.
Dallas Semiconductor Corporation: *See—*
Lee, Robert D., 4,989,261, Cl. 455-127.000.
Daly, Paul D., to Siemens-Bendix Automotive Electronics L.P. Variable compression ratio internal combustion engine. 4,987,863, Cl. 123-48.0AA.
Dameron, Joseph T., Jr. Gutter facia design adapted for use in box beam applications. 4,987,717, Cl. 52-731.000.
Damon, Gerald D.; and Godlew, David P., to Eaton Corporation. Torsional vibration damping mechanism. 4,987,987, Cl. 192-106.100.
D'Angelo, Charles; Baldoni, Joseph G., II; and Buljan, Sergej-Tomislav, to GTE Laboratories Incorporated. Metal carbide, nitride, or carbonitride whiskers coated with metal carbides, nitrides, carbonitrides, or oxides. 4,988,564, Cl. 428-368.000.
Danko, Andras: *See—*
Szekely, Tamas; Nagy, Gabor; Danko, Andras; Szepvolgyi, Janos; Gal, Andras; and Libor, Oszkar, 4,988,238, Cl. 405-263.000.
Danna, Jori L.; and Bauer, Mary M., to Baby Bumpers, Inc. Bumper guard for baby walker. 4,988,138, Cl. 293-127.000.
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J. Sensor and transducer apparatus. 4,987,783, Cl. 73-862.640.
D'Antonio, Nicholas J.: *See—*
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,987,783, Cl. 73-862.640.
Danzaki, Tsutomu: *See—*
Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,988,931, Cl. 318-293.000.
Danzin, Charles: *See—*
Halazy, Serge J.; and Danzin, Charles, 4,988,680, Cl. 514-81.000.
D'Aquila, Anthony: *See—*
Smart, Charles F.; Varian, Raymond H.; and D'Aquila, Anthony, 4,988,028, Cl. 227-3.000.
Darlington, Roy K., to Baroid Technology, Inc. Well fluid and test method. 4,987,960, Cl. 175-42.000.

Das, Sajal; Prevorsek, Dusan C.; Sharma, Raj; and DeBona, Bruce, to Allied-Signal. Flame resistant article made of phenolic triazine and related method using a pure cyanato novolac. 4,988,780, Cl. 525-504.000.

Das, Suryya K.; Porter, Samuel, Jr.; and Tyger, Wayne H., to PPG Industries, Inc. Polymers prepared by polymerizing alpha, beta-ethylenically unsaturated acids and epoxy compounds and cross-linked products therefrom. 4,988,766, Cl. 525-123.000.

Datatape Incorporated: *See—*
Zevin, Thomas M.; and Utley, Roy A., 4,989,110, Cl. 360-107.000.

Daugherty, Andrew H., to Vermette Machine Company, Inc. Telescoping portable lift. 4,987,976, Cl. 187-11.000.

Daunt, Geraldine H.: *See—*
Chandra, Suresh; and Daunt, Geraldine H., 4,989,216, Cl. 372-97.000.

Davidson, Wayne A.; and Hossain, Sahadat, to AT&T Bell Laboratories. Telephone agent management information system. 4,988,209, Cl. 370-58.200.

Davies, Paul; O'Bryan, Nelson B., Jr.; and Philip, James B., Jr., to Minnesota Mining and Manufacturing Company. Stabilizers for photographic emulsions. 4,988,615, Cl. 430-576.000.

Davis, Brad S. Small animal bath. 4,987,860, Cl. 119-158.000.

Davis, Cecil J.: *See—*
Freeman, Dean W.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., 4,988,533, Cl. 427-38.000.
Jucha, Rhett B.; Davis, Cecil J.; Huang, Steve S.; Loewenstein, Lee M.; and Achenbach, Jeff D., 4,988,644, Cl. 437-225.000.

Davis, Derek: *See—*
Khanna, Amarpal S.; and Davis, Derek, 4,988,959, Cl. 331-117.00D.

Davis, Larry: *See—*
Effland, Richard C.; Klein, Joseph T.; and Davis, Larry, 4,988,690, Cl. 514-213.000.

Davis, Robert F.: *See—*
Bragaw, Chester G., Jr.; Concannon, Thomas P.; and Davis, Robert F., 4,988,540, Cl. 427-155.000.

Davis, Terrill M.; Flynn, Charles J.; and Knipp, Jerry L., to Hallmark Cards, Inc. Enhanced lighting for ornaments. 4,989,120, Cl. 362-35.000.

Davis Water & Waste Industries, Inc.: *See—*
Medders, Carlton, II, 4,988,439, Cl. 210-264.000.

Dawes, Charles R. Compact portable dispensing system for edibles such as tea. 4,988,019, Cl. 222-189.000.

Dawson, James M.: *See—*
Hollinger, Raymond D.; Dawson, James M.; and Vaughan, Edward A., 4,988,070, Cl. 248-613.000.

Daxrose Pty. Ltd.: *See—*
Eaglesham, Wallace C. S., 4,987,631, Cl. 15-21.100.

De la Rue Systems Limited: *See—*
Melleney, Derek A.; Reeves, David C.; and Potter, Michael, 4,988,206, Cl. 356-446.000.

de la Chevreliere, Ayme' : *See—*
Ducrot, Jean L.; and de la Chevreliere, Ayme' , 4,988,041, Cl. 239-2.100.

Dean, Susan L.: *See—*
Gaylord, John F., Jr.; and Dean, Susan L., 4,987,891, Cl. 128-87.00B.

DeBona, Bruce: *See—*
Das, Sajal; Prevorsek, Dusan C.; Sharma, Raj; and DeBona, Bruce, 4,988,780, Cl. 525-504.000.

De Clercq, Erik; and Iigo, Masaaki, to Stichting Rega VZW. Combinations of FU and BVU as anti-adenocarcinoma agents. 4,988,678, Cl. 514-50.000.

Deere & Company: *See—*
Bennett, Robert E., 4,988,326, Cl. 460-110.000.

DeFeo, Paul J.: *See—*
Pai, Damodar M.; Yanus, John F.; and DeFeo, Paul J., 4,988,595, Cl. 430-59.000.

Delafield, Fredrick B. Technique for mounting panels for furniture. 4,987,713, Cl. 52-400.000.

Delano, Mark A., to Union Carbide Corporation. Reduced No_x combustion method. 4,988,285, Cl. 431-5.000.

Delco Electronics Overseas Corporation: *See—*
Allen, Phillip G.; and Rigby, Gordon J., 4,987,630, Cl. 15-1.510.

De Leeuw, Dagobert M.: *See—*
Severin, Jan W.; De With, Gijsbertus; De Leeuw, Dagobert M.; and Mutsaers, Cornelis A. H. A., 4,988,672, Cl. 505-1.000.

Delevallee, Francoise : *See—*
Clemence, Francois; Le Martret, Odile; and Delevallee, Francoise , 4,988,708, Cl. 514-312.000.
Clemence, Francois; Fortin, Michel; Le Martret, Odile; and Delevallee, Francoise, 4,988,810, Cl. 544-128.000.

Delgado, Joaquin, to Minnesota Mining and Manufacturing Company. Hollow acid-free acrylate polymeric microspheres having multiple small voids. 4,988,567, Cl. 428-402.000.

DeLong, Bradley W., to Phillips Petroleum Company. Heat and power supply system. 4,987,735, Cl. 60-39.040.

Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., to Sherman Industries, Inc. Automated car wash system. 4,988,042, Cl. 239-263.000.

Delpuech, Alain: *See—*
Boyle, Bruce W.; Stanisiere, Claude; and Delpuech, Alain, 4,987,969, Cl. 181-102.000.

Demetre, Margaret K. Insecticidal paste including powdered boric acid. 4,988,511, Cl. 424-84.000.

Demlehner, Ulrich; Beubzer, Bernward; and Wolfgruber, Matthias, to Wacker-Chemis GmbH. Process for preparing structures of inorganic fiber material containing silicone resin. 4,988,470, Cl. 264-137.000.

De Munck, Johannes W. J.; and Lohmeijer, Johannes H. G. M., to GE Plastics. Polymer mixture comprising a polyphenylene ether, a block copolymer, a phosphate ester and additives. 4,988,565, Cl. 428-373.000.

Den norske stats oljeselskap a.s.: *See—*
Horvei, Knut; and Sandved, Jonas S., 4,988,538, Cl. 427-53.100.

Den Hartog, Herman C.; Palmer, George T.; and Yeramyan, Ara G., to Du Pont de Nemours, E. I., and Company. Coating composition of acrylic polymers containing reactive groups and an epoxy organosilane. 4,988,759, Cl. 524-517.000.

Denk, Joseph, to Allied-Signal Inc. Method of making a dynamoelectric machine with superconducting magnet rotor. 4,987,674, Cl. 29-596.000.

Deppert, Norbert; and Umlauf, Helmut, to Fichtel & Sachs AG. Cylinder piston rod unit. 4,987,826, Cl. 92-168.000.

Dersch, Helmut, to Asea Brown Boveri Ltd. Electrical conductor in wire or cable form composed of a sheathed wire or of a multiple-filament conductor based on a ceramic high-temperature superconductor. 4,988,669, Cl. 505-1.000.

Desai, Umesh C.: *See—*
Gola, Edward F.; and Desai, Umesh C., 4,988,768, Cl. 525-195.000.

Designcraft International Ltd.: *See—*
Shortall, John F., 4,988,117, Cl. 280-646.000.

Designs for Vision, Inc.: *See—*
Feinbloom, Richard E., 4,988,185, Cl. 351-233.000.

Despatch Industries, Inc.: *See—*
Melgaard, Hans L., 4,988,288, Cl. 432-72.000.

Desrousseaux, Martine E., to TFK. Process and device for determining the camber of a sheet. 4,989,164, Cl. 364-551.010.

Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, to Chinoin Gyogyszer- Es Vegyeszeti Termekek Gyara, R. T. Fungicide compositions. 4,988,693, Cl. 514-231.200.

Detroit Stoker Company: *See—*
Reschly, David C.; and Alt, Kenneth D., 4,987,837, Cl. 110-165.00R.

Detweiler, Charles A.: *See—*
Martus, Charles R.; Detweiler, Charles A.; and Beneker, Gerit V. V., 4,987,968, Cl. 180-272.000.

Deutsche Thomson-Brandt GmbH: *See—*
Spruck, Manfred, 4,988,927, Cl. 315-371.000.

De Waal, Cornelis G., to Bently Nevada Europa B.V. Apparatus for measuring the thickness of piston rider rings. 4,987,774, Cl. 73-120.000.

De With, Gijsbertus: *See—*
Severin, Jan W.; De With, Gijsbertus; De Leeuw, Dagobert M.; and Mutsaers, Cornelis A. H. A., 4,988,672, Cl. 505-1.000.

DeYoung, David H., to Aluminum Company of America. Production of lithium by direct electrolysis of lithium carbonate. 4,988,417, Cl. 204-68.000.

Dhong, Sang H.; and Hwang, Wei, to International Business Machines Corp. Method for fabricating a mesa transistor-trench capacitor memory cell structure. 4,988,637, Cl. 437-52.000.

Dial, James R.: *See—*
Moore, Carl O.; and Dial, James R., 4,988,531, Cl. 426-578.000.

Diaphon Development AB: *See—*
Mangold, Stephan E., 4,989,251, Cl. 381-68.200.

Diaz, Gilberto B. Musical cymbal support and revolver accessories. 4,987,817, Cl. 84-421.000.

Dickens, E. Douglas, Jr.; and Mazany, Anthony M., to B. F. Goodrich Company, The. Passivated rare earth magnet or magnetic material compositions. 4,988,755, Cl. 524-401.000.

Dickerson, Jack A.; Greeson, James C., Jr.; and Poley, Neil M., to International Business Machines Corporation. TFT LCD device having color filter layer decal. 4,988,168, Cl. 350-339.00F.

Didier-Werke AG: *See—*
Santowski, Klaus; Leupold, Hermann; and Angeler, Alois, 4,988,649, Cl. 501-133.000.

Di Domenico, Roberto; Gandolfi, Carmelo A.; Spinelli, Silvano; Lumachi, Bruno; Tofanetti, Odoardo; and Tognella, Sergio, to Boehringer Biochemia Robin S.p.A. Cyclic amino-thioacetal amides, a process for the preparation thereof and pharmaceutical compositions. 4,988,701, Cl. 514-255.000.

Diefenbaker, Thomas A.: *See—*
Lutts, William P.; Diefenbaker, Thomas A.; and Fedorovich, George, 4,989,222, Cl. 377-24.100.

Diehl, Donald R.: *See—*
Anderson, Richard B.; Factor, Ronda E.; Adin, Anthony; and Diehl, Donald R., 4,988,611, Cl. 430-494.000.

Diehl, John W., to Und-Sem Foundation. Open-split interface for mass spectrometers. 4,988,870, Cl. 250-288.000.

Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, to Bayer Aktiengesellschaft. Sulphonyliso(thio)urea derivatives as herbicides. 4,988,379, Cl. 71-90.000.

Diels, Gaston S. M.: *See—*
Janssens, Frans E.; Diels, Gaston S. M.; and Pille, Geert M. E., 4,988,689, Cl. 514-212.000.

Diemer, Gordon J., to John Henry Company, The. Method and apparatus for stripping tags from die cut sheets. 4,987,723, Cl. 53-399.000.

Dietrich, Klaus-Georg: *See—*
Dietrich, Walter; and Dietrich, Klaus-Georg, 4,987,951, Cl. 164-466.000.

Dietrich, Walter; and Dietrich, Klaus-Georg, to Leybold Aktiengesellschaft. Method and apparatus for the vertical casting of metal melts. 4,987,951, Cl. 164-466.000.

Dietrich, Walter; Ranke, Horst; Stumpp, Herman; and Heuser, Claus, to Leybold A.G. Process for controlling the strike positions of a plurality of electron beams on a melting bath. 4,988,844, Cl. 219-121.170.

Dietz, Douglas W.: *See—*
Noble, Milton L.; Milton, Albert F.; Endres, Darrel W.; and Dietz, Douglas W., 4,989,067, Cl. 357-69.000.

Difco Laboratories Incorporated: *See—*
Smith, Jerry W.; and Sullivan, Nadine M., 4,988,302, Cl. 435-298.000.

DiFonzo, Joseph P.: *See—*
Kemble, Gary A.; Nietopski, Melvin C.; and DiFonzo, Joseph P., 4,988,036, Cl. 228-217.000.

Digital Equipment Corp.: *See—*
Narhi, Larry; and Pitman, Thomas, 4,988,890, Cl. 307-147.000.
Weng, Lih-Jyh, 4,989,211, Cl. 371-42.000.

Dimmick, Henry M.; Schneider, Paul; and Spryn, Richard, to AGR International, Inc. Method and apparatus for inspection of containers. 4,987,768, Cl. 73-37.500.

D'Incan, Esther: *See—*
Troupel, Michel; Sibille, Soline; Perichon, Jacques; D'Incan, Esther; and Saboureau, Christhophe, 4,988,416, Cl. 204-59.00R.

Dingwall, Andrew G. F., to Harris Corporation. Semiconductor transmission gate with capacitance compensation. 4,988,902, Cl. 307-572.000.

Dircks, Kenneth W.: *See—*
Watkins, David S.; Dircks, Kenneth W.; and Epp, Danny G., 4,988,583, Cl. 429-30.000.

Dirscherl, Reinhard; and Lill, Ernst, to Messerschmitt-Boelkow-Blohm GmbH. Method and apparatus for steering moving objects. 4,988,058, Cl. 244-3.160.

DiSomma, Joseph: *See—*
Ounanian, Hovig O.; Cohen, Kenneth A.; DiSomma, Joseph; and Gedeon, Harvey, 4,988,502, Cl. 424-63.000.

Dixi S.A.: *See—*
Roesch, Edouard, 4,987,668, Cl. 29-568.000.

Dixon, Thomas E.: *See—*
Corcoran, Sean P.; Dixon, Thomas E.; Farmer, Stanley; Hungerford, Emory D.; and Mallory, Mark, 4,987,935, Cl. 144-34.00R.

Do, Anh T.; and Huvey, Michel, to Institut Francais Du Petrole. Coupling for a shaft having a reinforcement framework. 4,988,128, Cl. 285-149.000.

Dobkin, Robert C.: *See—*
Sevastopoulos, Nello G.; and Dobkin, Robert C., 4,988,952, Cl. 330-51.000.

Dr. Ing. H. C. F. Porsche Aktiengesellschaft: *See—*
Mueller, Robert; Maier, Ulrich; and Raff, Friedrich, 4,987,792, Cl. 74-473.00R.

Dr. Johannes Heidenhain GmbH: *See—*
Michel, Dieter; and Huber, Walter, 4,988,864, Cl. 250-231.160.

Doddington, George R.: *See—*
Schalk, Thomas B.; and Doddington, George R., 4,989,248, Cl. 381-42.000.

Dohmeier, Hans-Otto, to Erdmann, Karl-Heniz, a part interest. Conveyor belt scraper. 4,987,993, Cl. 198-499.000.

Dohrmann, Wolfgang, to Boge AG. Impact damper for a motor vehicle. 4,988,081, Cl. 267-64.150.

Doi, Shuji: *See—*
Tanaka, Toshihiko; and Doi, Shuji, 4,988,608, Cl. 430-325.000.

Dolganov, Grigory M.: *See—*
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

Dominesey, Andrew E.: *See—*
Morse, Mark J.; and Dominesey, Andrew E., 4,988,054, Cl. 242-71.700.

Dompert, Wolfgang: *See—*
Seidel, Peter-Rudolf; Horstmann, Harald; Traber, Jorg; Dompert, Wolfgang; Glaser, THomas; and Schuurmann, Teunis, 4,988,809, Cl. 544-121.000.

Donner, Richard A., to Eaton Corporation. Diaphragm actuated valve assembly. 4,987,920, Cl. 137-242.000.

Dopatka, Hans-Detlef; and Schmidtberger, Rudolf, to Behringwerke Aktiengesellschaft. Lactoferrin-containing incubation medium for solid-phase immunometric methods and its use. 4,988,629, Cl. 436-518.000.

Dornhagen, Jurgen; Angerbauer, Rolf; Metzger, Karl G.; and Zeiler, Hans-Joachim, to Bayer Aktiengesellschaft. Cephalosporins derivatives. 4,988,685, Cl. 514-202.000.

Dorsett, Michael D.: *See—*
Peacock, David J. H.; and Dorsett, Michael D., 4,987,769, Cl. 73-49.700.

Dosaka, Katsumi: *See—*
Kumanoya, Masaki; Dosaka, Katsumi; Konishi, Yasuhiro; Komatsu, Takahiro; and Tobita, Youichi, 4,989,183, Cl. 365-222.000.

Doshak, John M.: *See—*
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Dougan, Duane G.: *See—*
Hoersten, Kenneth P.; Bolles, Albert D.; Dougan, Duane G.; and Akad, Marcia E., 4,988,530, Cl. 426-577.000.

Doughty, Kevin, to Radon Testing Corporation of America. Personnel radiation dosimetry device and testing unit. 4,988,876, Cl. 250-336.100.

Dow Chemical Company, The: *See—*
Barnes, Sharon J.; Beutnagel, James W.; Mack, Russel T.; Mills, Aaron A.; and Smith, John, III, 4,988,211, Cl. 374-121.000.
Christensen, Stephen B.; Schulz, Gary J.; and Kling, Susan, 4,988,807, Cl. 536-127.000.
Harner, Richard S.; and Myers, Charles J., 4,988,155, Cl. 350-96.100.
Jeanes, Thomas O.; Summers, John D.; and Sanders, Edgar S., Jr., 4,988,371, Cl. 55-16.000.
Littlefield, David E., 4,988,906, Cl. 310-90.500.
Matthews, W. Thomas; and Paalman, H. Hunter, 4,988,737, Cl. 521-26.000.
McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Goswami, Bhuvenesh C., 4,987,664, Cl. 28-103.000.
McKinney, Osborne K.; Eversdyk, David A.; and Rowland, Michael E., 4,988,781, Cl. 526-68.000.

Dow Corning K.K.: *See—*
Ikada, Yoshito; and Gen, Shokyu, 4,988,761, Cl. 524-557.000.

Dow Elanco: *See—*
Kim, Kay K.; Krauss, Richard C.; and Orvik, Jon A., 4,988,812, Cl. 544-263.000.

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Matthiessen, Hans, 4,988,429, Cl. 204-408.000.

Drake, Charles A., to Phillips Petroleum Company. Dimerization process and catalysts therefor. 4,988,658, Cl. 502-174.000.

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Drawl, William R.; and McCune, Robert C., to Ford Motor Company. Method of toughening diamond coated tools. 4,988,421, Cl. 204-192.300.

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Kenmochi, Kazuei, 4,988,274, Cl. 425-174.400.

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Dubal, Hans-Rolf: *See—*
Scherowsky, Gunter; Gay, Jurgen; Dubal, Hans-Rolf; Escher, Claus; Hemmerling, Wolfgang; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,988,459, Cl. 252-299.610.

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Dumican, Barry L.; and Andrews, Barbara, to American Cyanamid Company. Prosthetic tubular article. 4,987,665, Cl. 28-218.000.

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Dumont Holding Company: *See—*
Beal, David E.; Dumont, John W., Jr.; and Matthews, Andrew S., 4,987,952, Cl. 165-16.000.

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Dunmead, Stephen D.: *See—*
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Dunn, James J., to Chicago Metallic Corporation. Parallel beam system. 4,987,715, Cl. 52-489.000.

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Applegate, Lynn E.; Erkenbrecher, Carl W., Jr.; and Winters, Harvey, 4,988,444, Cl. 210-636.000.
Bergstein, Paul L.; and Subramanyam, Vinayakam, 4,988,827, Cl. 549-451.000.
Bragaw, Chester G., Jr.; Concannon, Thomas P.; and Davis, Robert F., 4,988,540, Cl. 427-155.000.
Den Hartog, Herman C.; Palmer, George T.; and Yeramyan, Ara G., 4,988,759, Cl. 524-517.000.
Perusich, Stephen A.; and Keating, James T., 4,988,364, Cl. 8-115.520.

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Wingrave, James A.; Carter, Thomas S.; and Palmer, Charles F., Jr., 4,988,450, Cl. 252-8.514.

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Adney, Billy R.; Alworth, Charles W.; Durkee, John B.; and Jeffries, Bryce T., 4,987,914, Cl. 137-8.000.

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Jager, Gerhard; Kraatz, Udo; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 4,988,383, Cl. 71-92.000.
Kramer, Wolfgang; Weissmuller, Joachim; Holmwood, Graham; Berg, Dieter; Dutzmann, Stefan; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,988,729, Cl. 514-452.000.
Stroech, Klaus; Brandes, Wilhelm; and Dutzmann, Stefan, 4,988,819, Cl. 548-267.800.

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Shirosaka, Toshiaki; and Ten, Nobuyuki, 4,988,963, Cl. 333-261.000.

Dyer, Christopher K., to Bell Communications Research, Inc. Compact fuel cell and continuous process for making the cell. 4,988,582, Cl. 429-30.000.

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Whitehead, Thomas W.; Hunsperger, Robert G.; and Simms, Garfield, 4,989,051, Cl. 357-19.000.

Eaglesham, Wallace C. S., to Daxrose Pty. Ltd. Cleaning attachment. 4,987,631, Cl. 15-21.100.

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Greenawalt, Steven C., 4,987,804, Cl. 81-64.000.

Eastman Kodak Company: *See*—
Anderson, Richard B.; Factor, Ronda E.; Adin, Anthony; and Diehl, Donald R., 4,988,611, Cl. 430-494.000.
Barbee, Robert B.; and Phillips, Brian S., 4,988,793, Cl. 528-272.000.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,988,880, Cl. 250-483.100.
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Columbus, Richard L.; and Kissel, Thomas R., 4,988,341, Cl. 604-306.000.
Fischer, Ulrich; Goeltenboth, Frank; Kurze, Hans-Juergen; and Wagner, Heinz, 4,988,002, Cl. 206-449.000.
Fiske, John M., 4,988,029, Cl. 227-5.000.
Hall, Douglas O.; Frank, Lee F.; and Muller, Bruce R., 4,989,028, Cl. 354-324.000.
Long, Michael E., 4,988,667, Cl. 503-227.000.
Lubinsky, Anthony R.; and Kulpinski, Robert W., 4,988,873, Cl. 250-327.200.
Machonkin, Harold I.; and Kerr, Donald L., 4,988,604, Cl. 430-264.000.
Markis, William R.; Papa, James M.; and Murray, Michael T., 4,988,932, Cl. 318-560.000.
Mauer, Andrew J.; and Stetz, Thomas T., 4,987,853, Cl. 118-657.000.
Mellender, Fredric H.; Straw, Andrew G.; and Riegel, Stephen E., 4,989,132, Cl. 364-200.000.
Mir, Jose M.; and Hung, Liang-sun, 4,988,674, Cl. 505-1.000.
Morse, Mark J.; and Dominesey, Andrew E., 4,988,054, Cl. 242-71.700.
Palum, Russell J.; and Greivenkamp, John E., 4,988,886, Cl. 250-561.000.
Paxton, K. Bradley, 4,989,078, Cl. 358-88.000.
Pitt, Alan R.; Wear, John T.; Richardson, Rachel; and Young, David, 4,988,610, Cl. 430-449.000.
Sander, Ingolf; and Marchant, Alan B., 4,989,189, Cl. 369-13.000.
Smith-Lewis, Margaret J., 4,988,627, Cl. 436-165.000.
Weber, Helmut; and Evans, Steven, 4,988,665, Cl. 503-227.000.
Wilson, William B., 4,989,036, Cl. 355-106.000.

Eaton Corporation: *See*—
Damon, Gerald D.; and Godlew, David P., 4,987,987, Cl. 192-106.100.
Donner, Richard A., 4,987,920, Cl. 137-242.000.
Gines, Paul K., 4,988,262, Cl. 414-749.000.
Mack, Michael E., 4,987,933, Cl. 141-7.000.
Nowicke, John H., 4,987,937, Cl. 152-400.000.

Eckberg, Richard P., to General Electric Company. Radiation self-sensitized silicone polymers. 4,988,743, Cl. 522-99.000.

Eckerle, Joseph S.; and Winter, Dean C., to Colin Electronics Co., Ltd. Apparatus for positioning transducer for blood pressure monitor. 4,987,900, Cl. 128-672.000.

Eckstein, Gunter K., to Shell Oil Company. Process for removal of flyash deposits. 4,988,367, Cl. 48-203.000.

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Houle, Jean-Francois; and Paris, Jean, 4,988,543, Cl. 427-372.200.

Eddleman, Harold L. Oil spill corral. 4,988,438, Cl. 210-242.300.

Edelson, Nathan E. Adjustable personal support apparatus. 4,987,625, Cl. 5-431.000.

Edtech Company: *See*—
Schwartz, Edward M.; and Everman, Wilburn D., 4,987,835, Cl. 108-144.000.

Eertink, Jan H.; Liem, Seeng D.; Malguzzi, Antonio; and Morris, Ronald M., to Lever Brothers Company Division of Conopco, Inc. Low phosphorus containing detergent powders and process for preparing them: surfactant, aluminosilicate, sodium silicate and polyacrylate. 4,988,454, Cl. 252-140.000.

Effland, Richard C.; Klein, Joseph T.; and Davis, Larry, to Hoechst-Roussel Pharmaceuticals Inc. 1-aryloxy-2,3,4,5-tetrahydro-3-benzazepines and anti-depressant use thereof. 4,988,690, Cl. 514-213.000.

Egusa, Syun: *See*—
Yasuda, Satoshi; Wakayama, Shigeru; Tsukumo, Yoshiaki; Haraguchi, Takashi; and Egusa, Syun, 4,987,851, Cl. 118-403.000.

Ehrke, Wiley J.: *See*—
Soto, Roy L.; Ehrke, Wiley J.; and Homkes, Robert J., 4,989,202, Cl. 370-13.000.

Eibeck, Richard E.: *See*—
Magid, Hillel; Eibeck, Richard E.; Van Der Puy, Michael; Hollister, Richard M.; and Lavery, Dennis M., 4,988,455, Cl. 252-171.000.

Eichman, Carl E.: *See*—
Mulder, James R.; and Eichman, Carl E., 4,988,149, Cl. 312-223.000.

Eickmann, Karl. Radially flexible snap ring. 4,987,650, Cl. 24-16.00R.

Eifert, Klaus, to Hohe KG. Outside rear-view mirror for vehicles. 4,988,178, Cl. 350-631.000.

Eino, Teruo, to Olympus Optical Co., Ltd. Method of inspecting objects by image pickup means. 4,989,083, Cl. 358-107.000.

Eisai Co., Ltd.: *See*—
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, 4,988,732, Cl. 514-560.000.

Eisermann, Armin, to Schulte-Schlagbaum Aktiengesellschaft. Burglarproof lock. 4,987,758, Cl. 70-379.00R.

Ejdenwik, Eugen E., to Noren & Persson AB. Adjustable eyebolt key. 4,987,805, Cl. 81-77.000.

Ekstrand, John P., to Spectra-Physics, Inc. Switched resistor regulator control when transfer function includes discontinuity. 4,988,942, Cl. 323-282.000.

El-Op Electro-Optics Industries Ltd.: *See*—
Winik, Michael, 4,989,215, Cl. 372-70.000.

El-Bayoumy, Karam; and Reddy, Bandaru S., to American Health Foundation. Method and composition for inhibiting colon carcinogenesis. 4,988,517, Cl. 424-702.000.

Elbe, Hans-Ludwig; Kranz, Eckart; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, to Bayer Aktiengesellschaft. Microbicidal substituted dioxolanes. 4,988,715, Cl. 514-383.000.

Elberbaum, David, to Elbex Video, Ltd. Apparatus for remote verification and control of close circuit television cameras. 4,989,085, Cl. 358-108.000.

Elbex Video, Ltd.: *See*—
Elberbaum, David, 4,989,085, Cl. 358-108.000.

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Hersh, Stuart, 4,988,286, Cl. 431-175.000.

Electricite de France - Service National: *See*—
Nuns, Jacques; and Girault, Alain, 4,987,828, Cl. 99-443.00C.

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Ament, Myron J., 4,987,616, Cl. 4-421.000.

Elmasry, Mohamed A.: *See*—
Jongewaard, Susan K.; Elmasry, Mohamed A.; and Kidnie, Kevin M., 4,988,602, Cl. 430-115.000.

Eltek Holdings Pty., Ltd.: *See*—
Knight, John K., 4,987,718, Cl. 52-742.000.

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Klink, Paul; Wichmann, Gunter; and Dahm, Gerhard, 4,987,832, Cl. 102-213.000.

Emberger, Roland: *See*—
Bruning, Jurgen; Emberger, Roland; Guntert, Matthias; Hopp, Rudolf; Kopsel, Manfred; Sand, Theodor; and Werkhoff, Peter, 4,988,526, Cl. 426-535.000.

Emhart, Inc.: *See*—
Smart, Charles F.; Varian, Raymond H.; and D'Aquila, Anthony, 4,988,028, Cl. 227-3.000.
Van Allen, Kent E., 4,988,842, Cl. 219-98.000.

Empire Brick Pty. Limited: *See*—
Mancuso, Noel A. M., 4,987,712, Cl. 52-387.000.

Ems-Inventa AG: *See*—
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Endo, Hiroshi: *See*—
Okazaki, Susumu; Endo, Hiroshi; and Hino, Kuniaki, 4,988,569, Cl. 428-403.000.

Endres, Darrel W.: *See*—
Noble, Milton L.; Milton, Albert F.; Endres, Darrel W.; and Dietz, Douglas W., 4,989,067, Cl. 357-69.000.

Engebretson, A. Maynard; and Fredrickson, John, to Storz Instrument Company. Implantable middle ear hearing aid system and acoustic coupler therefor. 4,988,333, Cl. 600-25.000.

Engel, Hartmut S., to Roeder GmbH Sitzmoebelwerke. Seating furniture. 4,988,145, Cl. 297-301.000.

Engelke, Friedrich: *See*—
Zare, Richard N.; Engelke, Friedrich; and Hahn, Jong H., 4,988,879, Cl. 250-423.00P.

Engler, Edward M.; Lee, Victor Y.; Nazzal, Adel I.; and Parkin, Stuart S. P., to International Business Machines Corporation. Ti-Ca-Ba-Cu-D compositions electrically superconducting above 120 degrees K and processes for their preparation. 4,988,668, Cl. 505-1.000.

Enjyouji, Hideo: *See*—
Yamashita, Masato; Enjyouji, Hideo; Kurihara, Hiroshi; Yamaguchi, Shoji; Shimizu, Hideto; Hashizume, Nichio; and Mori, Yasusuke, 4,989,154, Cl. 364-482.000.

Enwright, Michael C.: *See*—
Adamache, Ion-Ionel; Kennedy, William L.; and Enwright, Michael C., 4,988,389, Cl. 166-302.000.

Enyo, Hiroji: *See—*
Takemura, Yasuhiko; Zen, Shinichiro; Zama, Yoshiaki; and Enyo, Hiroji, 4,988,548, Cl. 428-368.000.

Epishin, Konstantin L.: *See—*
Merzhanov, Alexandr G.; Borovinskaya, Inna P.; Pitjulin, Alexandr N.; Ratnikov, Viktor I.; Epishin, Konstantin L.; and Kvanin, Vadim L., 4,988,480, Cl. 419-11.000.

Epp, Danny G.: *See—*
Watkins, David S.; Dircks, Kenneth W.; and Epp, Danny G., 4,988,583, Cl. 429-30.000.

Epple, Helmut, to Mahlo GmbH & Co. KG. Apparatus for straightening weft yarns in fabrics. 4,987,663, Cl. 26-51.300.

Eppley, Barry L.; Krukowski, Marilyn D.; and Osdoby, Philip A. Method for promoting hard tissue growth and repair in mammals. 4,988,358, Cl. 623-16.000.

Erdmann, Karl-Heniz: *See—*
Dohmeier, Hans-Otto, 4,987,993, Cl. 198-499.000.

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Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

Erickson, Kenneth R.: *See—*
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Erikson, J. Alden: *See—*
Chang, Wen-Hsuan; and Erikson, J. Alden, 4,988,778, Cl. 525-476.000.

Eriksson, Jens, to Aktiebolaget Jens Eriksson. Cover arrangement, especially for vehicles. 4,987,942, Cl. 160-243.000.

Erkenbrecher, Carl W., Jr.: *See—*
Applegate, Lynn E.; Erkenbrecher, Carl W., Jr.; and Winters, Harvey, 4,988,444, Cl. 210-636.000.

Ermont C. M.: *See—*
Marconnet, Guy, 4,988,207, Cl. 366-25.000.

Ersek, Tibor: *See—*
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

ESAB Aktiebolag: *See—*
Karlsten, Karl-Ola; and Larsson, Bertil, 4,988,846, Cl. 219-137.610.

Escher, Claus: *See—*
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Esco Corporation: *See—*
Corcoran, Sean P.; Dixon, Thomas E.; Farmer, Stanley; Hungerford, Emory D.; and Mallory, Mark, 4,987,935, Cl. 144-34.00R.

Eskofot A/S: *See—*
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Esselte Pendaflex Corporation: *See—*
Aaldenberg, Eric R.; and Soporowski, Andrzej L., 4,987,690, Cl. 40-341.000.

Essex Group, Inc.: *See—*
Graham, Randall C., 4,988,980, Cl. 340-692.000.

Essick, Gale W.: *See—*
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Eue, Ludwig: *See—*
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Euler, John W.: *See—*
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Evalahti, Osmo, to Valmet-Ahlstrom Inc. Apparatus for guiding wires of a double wire former. 4,988,408, Cl. 162-301.000.

Evans, James H.: *See—*
Pfefferkorn, Jason L., 4,988,346, Cl. 604-389.000.

Evans, Kenneth A.; Biley, Paul I.; and Rossall, Brian, to Unilever Patent Holdings B.V. Oral compositions. 4,988,498, Cl. 424-52.000.

Evans, Steven: *See—*
Weber, Helmut; and Evans, Steven, 4,988,665, Cl. 503-227.000.

Evanston Enterprises, Inc.: *See—*
Schakowsky, Harvey E.; and Bell, Gilbert W., 4,989,233, Cl. 379-92.000.
Schakowsky, Harvey E.; and Bell, Gilbert W., 4,989,234, Cl. 379-92.000.

Evdonina, Ljudmila V.: *See—*
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Everbloom Mushroom (PTE) Ltd.: *See—*
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Eveready Battery Company, Inc.: *See—*
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Everhart, Lawrence, to Technology Tool Company. Electrode with both outside and inside flow of electrolyte for electrochemical machining. 4,988,425, Cl. 204-224.00M.

Everman, Wilburn D.: *See—*
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Eversdyk, David A.: *See—*
McKinney, Osborne K.; Eversdyk, David A.; and Rowland, Michael E., 4,988,781, Cl. 526-68.000.

Evertsen, Gary L. Trailer hitching aid. 4,988,116, Cl. 280-477.000.

Exxon Research and Engineering Company: *See—*
Aldridge, Clyde L.; Bearden, Roby, Jr.; and Riley, Kenneth L., 4,988,434, Cl. 208-251.00H.
Haberman, Joel I.; Overfield, Robert E.; and Robbins, Winston K., 4,988,446, Cl. 210-656.000.
Manalastas, Pacifico V.; Thaler, Warren A.; Drake, Evelyn N.; and Pasternak, Israel S., 4,988,377, Cl. 71-28.000.

Facchi, Raffaele: *See—*
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Factor, Ronda E.: *See—*
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Fahnler, Friedrich: *See—*
Meyer, Rolf-Volker; Fahnler, Friedrich; Muller, Hanns-Peter; Wandel, Martin; and Heinz, Hans-Detlef, 4,988,549, Cl. 428-35.700.

Faig, Harold J.; and Sparer, Ronald M., to Cincinnati Milacron Inc. Injection molding machines having a brushless DC drive system. 4,988,273, Cl. 425-145.000.

Family Health International: *See—*
Foldesy, Robin G., 4,988,736, Cl. 514-652.000.

Fan, Steve T., to General Mills, Inc. Ready-to-eat cereal of reduced sodium content and method of preparation. 4,988,521, Cl. 426-93.000.

Fancher, Ricky L., to Hurd Lock and Manufacturing Co., Inc. Vehicle switch with rotation preventing means. 4,987,756, Cl. 70-186.000.

Fantucci, Mario: *See—*
Benelli, Giancarlo; Carenzi, Angelo; Chiarino, Dario; and Fantucci, Mario, 4,988,691, Cl. 514-214.000.

Fanuc Ltd.: *See—*
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Farbood, Mohamad I.: *See—*
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Buckholz, Lawrence L., Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; Scharpf, Lewis G.; and Seitz, Eugene W., 4,988,527, Cl. 426-536.000.

Farmer, Stanley: *See—*
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Faroudja, Yves C.: *See—*
Campbell, Jack J.; Faroudja, Yves C.; and Lyon, Thomas C., 4,989,090, Cl. 358-140.000.

Farr, Glyn P. R.; Martin, Anthony E.; and Fuller, Robert G., to Lucas Industries public limited company. Hydraulic anti-lock braking systems for vehicles. 4,988,148, Cl. 303-116.000.

Fast, Jacob. Merchandise tag for wire rod or flat crossbar hook. 4,987,692, Cl. 40-657.000.

Fauss, Rudolf; Seidler, Mark; Witle, Joseph W., deceased; Witte, Margarethe H., heir; Witte, Karin, heir; and Witte, Klaus G., heir, to Bayer Aktiengesellschaft. Cyano-containing polymers. 4,988,774, Cl. 525-340.000.

Fecteau, Anthony J.: *See—*
Vidwans, Mohan P.; Parkinson, Susan H.; Scott, Glenn; and Fecteau, Anthony J., 4,988,134, Cl. 292-198.000.

Feder, Emil. Lock for car doors, in particular for trunk. 4,987,757, Cl. 70-240.000.

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Lutts, William P.; Diefenbaker, Thomas A.; and Fedorovich, George, 4,989,222, Cl. 377-24.100.

Fehlhaber, Hans-Wolfram: *See—*
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Feinbloom, Richard E., to Designs for Vision, Inc. High add bifocal spectacles and methods of prescribing. 4,988,185, Cl. 351-233.000.

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Stryker, Martin W.; and Fennell, Thomas W., 4,987,623, Cl. 5-86.000.

Fensch, Thierry, to SGS-Thomson Microelectronics S.A. Analog signal waveform generator. 4,988,900, Cl. 307-494.000.

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Pedotti, Antonio; and Ferrigno, Giancarlo, 4,989,259, Cl. 382-42.000.
Fest, Christa: *See*—
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.
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Fey, Peter: *See*—
Angerbauer, Rolf; Hubsch, Walter; Fey, Peter; Bischoff, Hilmar; Petzinna, Dieter; Schmidt, Delf; and Thomas, Gunter, 4,988,711, Cl. 514-326.000.
Fichtel & Sachs AG: *See*—
Deppert, Norbert; and Umlauf, Helmut, 4,987,826, Cl. 92-168.000.
Fiedler, Paul; Littmann, Martin; Lenthe, Manfred; Noak, Achim; and Siekmann, Gerd, to Bayer Aktiengessellschaft. Process for the preparation of 2-(4-chlorophenylethyl)-2-tert.-butyl-oxirane. 4,988,829, Cl. 549-519.000.
Fiedler, Volker-Bernd: *See*—
Boshagen, Horst; Rosentreter, Ulrich; Lieb, Folker; Oediger, Hermann; Seuter, Friedel; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 4,988,820, Cl. 548-439.000.
Fierbaugh, Charles A. Chimney fire extinguishing apparatus. 4,987,958, Cl. 169-57.000.
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Bernard, Robin D.; Gardner, John G.; and Ueki, Jun, 4,988,440, Cl. 210-504.000.
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Oenning, James B.; and Clark, Ian S. R., 4,988,386, Cl. 75-247.000.
First Pacific Networks: *See*—
Serrone, Michael J., 4,989,220, Cl. 375-83.000.
Firth, Donald, to Stamet, Inc. Multiple-choke apparatus for transporting and metering particulate material. 4,988,239, Cl. 406-99.000.
Fischer, Ulrich; Goeltenboth, Frank; Kurze, Hans-Juergen; and Wagner, Heinz, to Eastman Kodak Company. Container for receiving stacks of stapled sheets. 4,988,002, Cl. 206-449.000.
Fish, David J.: *See*—
Sardano, Peter A.; Fish, David J.; and Sturnick, Gerard R., 4,988,087, Cl. 271-314.000.
Fiske, John M., to Eastman Kodak Company. Finisher accessory for hard copy printers. 4,988,029, Cl. 227-5.000.
Fitch, John: *See*—
Adams, Michael E.; and Fitch, John, 4,988,021, Cl. 223-94.000.
Fkui, Yutaka, to Tachi-S Co., Ltd. Apparatus for forming a seat. 4,988,282, Cl. 425-817.00R.
Flanigan, Sean: *See*—
Sampson, Robert; and Flanigan, Sean, 4,987,705, Cl. 52-72.000.
Flax, Stephen W.: *See*—
O'Donnell, Matthew; and Flax, Stephen W., 4,989,143, Cl. 364-413.250.
Fleming, Stephen D. Vehicle bumper assembly with foamed core. 4,988,137, Cl. 293-109.000.
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Marion, Ronald J., 4,987,644, Cl. 452-2.000.
Fletcher-Terry Company, The: *See*—
Kozyrski, Vincent T.; and Peters, Alan R., 4,987,814, Cl. 83-884.000.
Flux, Peter R., to Latchways Limited. Releasable coupling or attachment device. 4,988,248, Cl. 411-348.000.
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Davis, Terrill M.; Flynn, Charles J.; and Knipp, Jerry L., 4,989,120, Cl. 362-35.000.
FMC Corporation: *See*—
Groom, Stanley A., 4,987,934, Cl. 141-89.000.
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Beltz, Dale L., 4,988,862, Cl. 250-227.150.
Drawl, William R.; and McCune, Robert C., 4,988,421, Cl. 204-192.300.
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Oslapas, Algis; and Rumpel, Manfred, 4,987,963, Cl. 180-79.100.
Forman, Brian W.: *See*—
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Forrest, Charles P., Sr.; and Stump, John L. Fluid-filled neck exerciser. 4,988,093, Cl. 272-94.000.
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Forster, Siegfried; and Quell, Peter, 4,988,290, Cl. 432-103.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted thiadiazolylxyacetamides. 4,988,378, Cl. 71-90.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Use of difluoromethyl-thiadiazolyl-oxyacetamides as selective herbicides. 4,988,380, Cl. 71-90.000.
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Foster, David A.: *See*—
Christiansen, Paul J.; and Foster, David A., 4,988,220, Cl. 384-448.000.
Foster, James F.: *See*—
Peck, Glenn L., Jr.; Foster, James F.; and Pol, Kenneth J., 4,987,834, Cl. 104-300.000.
Fox, David A., to Westinghouse Electric Corp. Generator voltage regulation with non-linear compensation. 4,988,941, Cl. 322-28.000.
Fox, David H.: *See*—
Ratner, Elizabeth L.; and Fox, David H., 4,988,921, Cl. 315-159.000.
Fraley, Lowell D.: *See*—
Van Dijk, Christiaan; and Fraley, Lowell D., 4,988,491, Cl. 423-359.000.
Framatome: *See*—
Guironnet, Louis, 4,988,475, Cl. 376-248.000.
Francard, Jean-Louis, to Technicatome Societe Technique pour l'Energie Atomique. Method for the automatic line calibration of a sensor for measuring the concentration of a liquid phase dissolved electrochemical substance. 4,988,948, Cl. 324-444.000.
Franco, Christopher M. M.; Gandhi, Julia; Chatterjee, Sugata; Reddy, Goukanapalli C. S.; Ganguli, Bimal N.; Rupp, Richard H.; Kogler, Herbert; and Fehlhaber, Hans-Wolfram, to Hoechst Aktiengesellschaft. Macrolide antibiotic and its use as a medicinal agent. 4,988,677, Cl. 514-30.000.
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Franke, Siegfried: *See*—
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Frankl & Kirchner GmbH & Co KG Fabrik fur Elektromotoren u. elektrische Apparate: *See*—
Schmidt, Thomas; Olbrich, Bernd; Nohl, Gerd; and Rohr, Gustav, 4,988,865, Cl. 250-231.160.
Franklin, Michael L.: *See*—
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Freeman, Dean W.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., to Texas Instruments Incorporated. Method for deposition of silicon oxide on a wafer. 4,988,533, Cl. 427-38.000.
Frese, Richard: *See*—
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Freund, Edouard: *See*—
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Frey, Otto; and Koch: Rudolf, to Sulzer Brothers Limited. Fixing stem for an endoprosthesis. 4,988,359, Cl. 623-23.000.
Friary, Richard J.: *See*—
Ganguly, Ashit K.; Friary, Richard J.; Schwerdt, John H.; Siegel, Marvin I.; Smith, Sidney R.; Seidl, Vera A.; and Sybertz, Edmund J., 4,988,705, Cl. 514-282.000.
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Friedman, Robert M.; Randall, Grayson W.; Sheftic, Richard J.; and Spencer, David P., to International Business Machines Corporation. Map case network virtual connection interface system. 4,989,139, Cl. 364-200.000.
Friend, William H.: *See*—
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Frigerio, Marco; Gandolfi, Carmelo A.; Tofanetti, Odoardo; and Tognella, Sergio, to Boehringer Biochemia Robin S.p.A. 2-selenomethyl-1,4-dihydropyridines having calcium-antagonistic properties and pharmaceutical compositions containing them. 4,988,713, Cl. 514-356.000.
Fritzberg, Alan R.: *See*—
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Froesch, Ernst R.; Guler, Hans-Peter; Schmid, Christoph; and Zapf, Jurgen, to Ciba-Geigy Corporation. Method for preventing secondary effects. 4,988,675, Cl. 514-4.000.
Fruhling, Robert J.: *See*—
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Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, to Bayer Aktiengesellschaft. Flame-resistant thermoplastic polycarbonate molding compounds. 4,988,748, Cl. 524-141.000.

Fuji Electric, Co. Ltd.: *See*—
Hattori, Yoshimasa; Furusho, Noboru; Nakamura, Youichi; and Kuroda, Masami, 4,988,594, Cl. 430-59.000.
Nagasawa, Makoto; and Miwa, Hideyuki, 4,988,283, Cl. 429-17.000.
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Arai, Yoshihiro; Yasunaga, Tadashi; and Shirahata, Ryuji, 4,988,535, Cl. 427-38.000.
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Ohki, Nobutaka; Naruse, Hideaki; Nagaoka, Satoshi; and Hanaki, Kouichi, 4,988,613, Cl. 430-547.000.
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Fuji Valve Co., Ltd.: *See*—
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Fuji Xerox Co., Ltd.: *See*—
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Fujii, Masakatsu: *See*—
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Fujii, Nobuhiko: *See*—
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Fujii, Osamu: *See*—
Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, 4,988,271, Cl. 425-73.000.

Fujii, Shigeru: *See*—
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Fujii, Shinji: *See*—
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Fujikawa, Junji; and Tamura, Fumiaki, to Nippon Electric Glass Co., Ltd. Optical fiber fixing element and method of manufacturing same. 4,988,161, Cl. 350-96.200.

Fujiki, Hironao: *See*—
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Fujimoto, Michio: *See*—
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Fujimoto, Mitsuo; and Kitamura, Toru, to Sanyo Electric Co., Ltd. Speech synthesizing apparatus and method. 4,989,250, Cl. 381-51.000.

Fujimoto, Shinji, to Kabushiki Kaisha Daikin Seisakusho. Lock-up damper device for torque converter. 4,987,980, Cl. 192-3.280.

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Fujisaka, Takahiko; and Oh-hashi, Yoshimasa, to Mitsubishi Denki Kabushiki Kaisha. Spotlight mapping radar system. 4,989,008, Cl. 342-25.000.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
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Takenawa, Seishi; Ueda, Mikio; and Takeda, Hideki, 4,988,519, Cl. 426-63.000.

Fujita, Hirokatsu; Kashiwabara, Kimito; and Kanno, Yoshiaki, to Mitsubishi Jidosha Kogyo Kabushiki; and Mitsubishi Denki Kabushiki Kaisha. Method for controlling fuel at an acceleration time of an electronically-controlled fuel engine. 4,987,889, Cl. 123-492.000.

Fujita, Nagahisa, to Mazda Motor Corporation. Slippage preventing apparatus for a vehicle. 4,987,966, Cl. 180-197.000.

Fujita, Nobuhiko: *See*—
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Moriyama, Junichi; and Iwasaki, Masaaki, 4,989,130, Cl. 364-200.000.
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Okada, Makoto; and Yokoyama, Naoki, 4,989,052, Cl. 357-22.000.
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Fukuda, Akira; and Masuda, Itsuro, to Hamada Printing Co., Ltd. Paper feed device for rotary press. 4,987,830, Cl. 101-228.000.

Fukuda, Kenji, to Nitto Kohki Co., Ltd. Chamferring machine. 4,988,245, Cl. 409-178.000.

Fukuda, Takeshi; Fukushima, Motoo; Itoh, Kunio; and Fujiki, Hironao, to Shin-Etsu Chemical Co., Ltd. Fluorosilicone rubber composition. 4,988,758, Cl. 524-492.000.

Fukuda, Yukio: *See*—
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Fukui, Yutaka: *See*—
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Fukuyama, Shun-ichi; Yoneda, Yasuhiro; Miyagawa, Masashi; Nishii, Kota; and Matsuura, Azuma, to Fujitsu Limited. Preparation of lower alkyl polysilsesquioxane and formation of insulating layer of silylated polymer on electronic circuit board. 4,988,514, Cl. 428-447.000.

Fulk, Clyde W., Jr., to Koch Membrane Systems, Inc. Spiral wound filtration system and method of utilizing same. 4,988,445, Cl. 210-652.000.

Fuller, Robert G.: *See*—
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Funabashi, Motohisa; Sekozawa, Teruji; Shioya, Makoto; Onari, Mikihiko; Takahashi, Shinsuke; and Okazaki, Gohki, to Hitachi, Ltd. Method of controlling fuel supply to engine by prediction calculation. 4,987,888, Cl. 123-488.000.

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Funahashi, Takahiko: *See*—
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Funke, Hermann D., to Medtronic, Inc. Body bus medical device communication system. 4,987,897, Cl. 128-419.0PG.

Furrow, Edward D.; and Johenning, Leon C., II, to Genicom Corporation. Universal ribbon cartridge for high-speed printers. 4,988,224, Cl. 400-194.000.

Furukawa, Hideki; and Yamaguchi, Yuji, to Aisin Seiki Kabushiki Kaisha. Nozzle mechanism in a sanitary device. 4,987,617, Cl. 4-448.000.

Furusho, Noboru: *See*—
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Furuyama, Takaaki: *See*—
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Fury, Tommy J.; and Bailey, Gerald D. Warning and safety system indicating truck trailer tip-over condition. 4,988,974, Cl. 340-431.000.

Fusco, Ronald S.: *See*—
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Fuse, Chihiro; and Morita, Yutaka, to Sanyo Electric Co., Ltd. Telephone. 4,989,240, Cl. 379-355.000.

Fylan, Michael S.: *See*—
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G. D. Searle & Co.: *See*—
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Gabas, Carlos, to Industrias Techno-Matic, S.A. Safety mirror assembly for automobile sun visors. 4,988,180, Cl. 350-641.000.

Gabillet, Maurice. Modular manipulation arm. 4,988,259, Cl. 414-729.000.

Gabioud, Andre , to Thomson-CSF. Electron power tube cooled by circulation of a fluid. 4,988,910, Cl. 313-35.000.

Gaisser, Rudi, to C. C. Egelhaaf GmbH & Co. Maschinenfabrik KG. Doup heddle with magnetic coupling part. 4,987,928, Cl. 139-52.000.

Gal, Andras: *See*—
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Galaszewski, William, to Star Sprinkler Corporation. Deflector for side wall sprinkler head. 4,987,957, Cl. 169-37.000.

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Gallaher, Kenneth R.: *See*—
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Gandhi, Julia: *See*—
Franco, Christopher M. M.; Gandhi, Julia; Chatterjee, Sugata; Reddy, Goukanapalli C. S.; Ganguli, Bimal N.; Rupp, Richard H.; Kogler, Herbert; and Fehlhaber, Hans-Wolfram, 4,988,677, Cl. 514-30.000.

Gandolfi, Carmelo A.: *See*—
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Ganguly, Ashit K.; Friary, Richard J.; Schwerdt, John H.; Siegel, Marvin I.; Smith, Sidney R.; Seidl, Vera A.; and Sybertz, Edmund J., to Schering Corporation. Polycyclic quinoline, naphthyridine and pyrazinopyridine derivatives. 4,988,705, Cl. 514-282.000.

GAO Gesellschaft fur Automation und Organisation mbH: *See*—
Heckenkamp, Christoph; Stenzel, Gerhard; and Kaule, Wittich, 4,988,126, Cl. 283-92.000.

Garbe, James E.: *See*—
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Meyer, Urs; and Gartenmann, Niklaus, 4,987,649, Cl. 19-159.00A.

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Gatten, Ronald A.; and Joba, Lawrence R., to Spectra-Physics, Inc. Method and apparatus for time distributed use of ink-jets in a printer-plotter. 4,989,016, Cl. 346-1.100.

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De Munck, Johannes W. J.; and Lohmeijer, Johannes H. G. M., 4,988,565, Cl. 428-373.000.

Gebhard, Manfred: *See*—
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Gedeon, Harvey: *See*—
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Gefter, Alexander A.; and Marshall, Kenneth N., to Arneson Products, Inc. In-line leaf trap. 4,988,437, Cl. 210-237.000.

Geibel, Jon F.: *See*—
Cliffton, Michael D.; and Geibel, Jon F., 4,988,796, Cl. 528-388.000.

Gelb, Morris; Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, to Arco Chemical Technology, Inc. Propylene oxide production. 4,988,830, Cl. 549-529.000.

Gen, Shokyu: *See*—
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Ciokajlo, John J.; and Vogt, Daniel S., 4,987,736, Cl. 60-39.310.
Crawford, Carl R., 4,989,142, Cl. 364-413.150.
Eckberg, Richard P., 4,988,743, Cl. 522-99.000.
Haitko, Deborah A.; and Schissel, David N., 4,988,821, Cl. 548-461.000.
Liu, Yung S.; Cole, Herbert S.; Guida, Renato; and Rose, James W., 4,988,412, Cl. 204-15.000.
Medford, George F.; and Johnson, Donald S., 4,988,779, Cl. 525-478.000.
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O'Donnell, Matthew; and Flax, Stephen W., 4,989,143, Cl. 364-413.250.
Schissel, David N.; and Haitko, Deborah A., 4,988,792, Cl. 528-170.000.
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Stein, Judith, 4,988,741, Cl. 522-31.000.
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General Motors Corporation: *See*—
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Cantrell, Ronald J.; Klomp, Edward D.; Groff, Edward G.; Solomon, James G.; and Gorman, Michael J., 4,987,864, Cl. 123-65.0BA.
Chandler, Maurice P.; and Fylan, Michael S., 4,988,142, Cl. 296-146.000.
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Coleman, John R., 4,987,739, Cl. 60-562.000.
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Hollinger, Raymond D.; Dawson, James M.; and Vaughan, Edward A., 4,988,070, Cl. 248-613.000.
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McCreary, Charles H., 4,987,984, Cl. 192-45.000.
Papania, James R., 4,987,670, Cl. 29-451.000.
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Rau, Thomas E., 4,987,679, Cl. 29-897.200.
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Genicom Corporation: *See*—
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Hoersten, Kenneth P.; Bolles, Albert D.; Dougan, Duane G.; and Akad, Marcia E., 4,988,530, Cl. 426-577.000.

Gerdes, Richard C.; and Vokac, Peter R. Midlevel carrier modulation and demodulation techniques. 4,989,219, Cl. 375-17.000.

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Gerhold, Bruce W.: *See*—
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Gerlizt, Yonatan; Moran, Dan; and Raviv, Roni. Non hand-held toy. 4,988,111, Cl. 273-310.000.

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Geus, John W.: *See*—
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Gines, Paul K., to Eaton Corporation. Extended reach shuttle. 4,988,262, Cl. 414-749.000.

Giordano, James R.: *See*—
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Orain, Michel A., 4,988,327, Cl. 464-111.000.

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Gola, Edward F.; and Desai, Umesh C., to PPG Industries, Inc. Polyvinyl chloride plastisol based curable composition. 4,988,768, Cl. 525-195.000.

Gold, Peter N. Mounting for an automotive window panel. 4,987,699, Cl. 49-375.000.

Gold Star Co., Ltd.: *See*—
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Goldfarb, Adolph E. Surprise and learn molding toy. 4,988,321, Cl. 446-075.000.

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Good, Stanley B.; La Fond, John A.; Lachat, Michael J.; and Shah, Dinesh B., to Allied-Signal Inc. Air bag and method of fabricating same. 4,988,118, Cl. 280-743.000.

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Goodson, Albert A., Jr. Reinforced concrete building construction and method of forming same. 4,987,719, Cl. 52-743.000.

Gordon, Francis R., to M. L. Aviation Company Ltd. Arming unit. 4,987,820, Cl. 89-1.550.

Gorman, Michael J.: *See*—
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Goto, Tadaomi, to Sharp Kabushiki Kaisha. Master-slave communication system for stations having timer means. 4,988,989, Cl. 340-825.210.

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Grandis, Stanley. Spring clip. 4,987,659, Cl. 24-499.000.

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Greeson, James C., Jr.: *See*—
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Gresch, Walter, to Bucher, CHX; and Bucher-Guyer AG Maschinenfabrik. Process for selective removal of volatile substances from liquids, as well as unit and device for carrying out the process. 4,988,525, Cl. 426-493.000.

Gressett, Charles A., Jr., to Adams Rite Manufacturing Company. Retractable door handle motion transfer mechanism. 4,988,136, Cl. 292-336.300.

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GTE Laboratories Incorporated: *See—*
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Ratner, Elizabeth L.; and Fox, David H., 4,988,921, Cl. 315-159.000.
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Gurd, John R.; and Kawakami, Katsura, to Victoria University of Manchester, The; and Matsushita Electrical Industrial Co., Ltd. Delay management method and device. 4,989,136, Cl. 364-200.000.
Gurevich, Leon, to Cooper Industries, Inc. Higher current carrying capacity 250V subminiature fuse. 4,988,969, Cl. 337-260.000.
Gurke, Reinhard; and Altwicker, Berthold, to Boge AG. Apparatus for the computer-assisted control of vibration dampers of a vehicular suspension system as a function of the roadway. 4,989,148, Cl. 364-424.050.
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Halazy, Serge J.; and Danzin, Charles, to Merrell Dow Pharmaceuticals Inc. Phosphonoalkylpurine derivatives. 4,988,680, Cl. 514-81.000.
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Corrigan, Colin D.; Haley, Lawrence V.; and Menagh, Douglas P., 4,987,767, Cl. 73-23.360.
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Hall, E. L. Bo. Bright light indicator. 4,989,121, Cl. 362-61.000.
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Hall, Robert C., to Nordson Corporation. Apparatus for gas-aided dispensing of liquid materials. 4,987,854, Cl. 118-679.000.
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Davis, Terrill M.; Flynn, Charles J.; and Knipp, Jerry L., 4,989,120, Cl. 362-35.000.
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Holt, Joseph B.; Dunmead, Stephen D.; Halverson, Danny C.; and Landingham, Richard L., 4,988,645, Cl. 501-91.000.
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Hamada Printing Co., Ltd.: *See—*
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Tsuchiya, Yutaka; and Aoshima, Shinichiro, 4,988,859, Cl. 250-213.0VT.
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Findeisen, Kurt; Jelich, Klaus; and Hanssler, Gerd, 4,988,718, Cl. 514-363.000.
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Dingwall, Andrew G. F., 4,988,902, Cl. 307-572.000.
Satterfield, Nathaniel J.; and Struttmann, James D., 4,987,678, Cl. 29-868.000.
Soto, Roy L.; Ehrke, Wiley J.; and Homkes, Robert J., 4,989,202, Cl. 370-13.000.

Harris, Marva B.: *See*—
Price, Sankey E.; Kussin, Richard F.; Fruhling, Robert J.; and Harris, Marva B., 4,988,590, Cl. 426-595.000.

Harris, Samuel, to Transfresh Corporation. Controlled environment transportation of respiring comestibles. 4,987,745, Cl. 62-78.000.

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Schroter, Horst, 4,988,411, Cl. 202-251.000.

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Harvey, Hayes: *See*—
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Hattori, Yoshimasa; Furusho, Noboru; Nakamura, Youichi; and Kuroda, Masami, to Fuji Electric, Co. Ltd. Diazo photoconductor for electrophotography. 4,988,594, Cl. 430-59.000.

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Hayashi, Chikahisa: *See*—
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Hayashibara, Ken: *See*—
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Hayman, Edward G.: *See*—
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Andreas, Ronald D.; Heck, G. Michael; Kohler, Stewart M.; and Watts, Alfred C., 4,987,684, Cl. 33-304.000.

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Heilenz, Siegfried. Pulverizer with air filtering means. 4,988,046, Cl. 241-60.000.

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Heimlich, Henry J. Tracheal tube. 4,987,895, Cl. 128-207.140.
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Heisel, Michael; Marold, Freimut; and Lohmueller, Reiner, to Linde Aktiengesellschaft. Process for performing catalytic reactions. 4,988,431, Cl. 208-67.000.
Heitschel, Carl T.; and Reich, Paul W., to Chamberlain Group, Inc., The. System for establishing a code and controlling operation of equipment. 4,988,992, Cl. 340-825.690.
Held, Kurt. Process for fabricating processed wood material panels. 4,988,478, Cl. 264-518.000.
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Hellinger, Lance, to Spectra Physics, Inc. Reference flow liquid chromatography system with stable baseline. 4,988,447, Cl. 210-659.000.
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Townend, John, 4,987,907, Cl. 131-352.000.
Helms, James K. Tree climbing apparatus. 4,987,972, Cl. 182-187.000.
Hemmerling, Wolfgang: *See*—
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Henkel, Hanno; Rudolph, Karl-Heinz; Sahlmen, Friedhelm; and Brockmann, Rolf, to Bayer Aktiengesellschaft. Gulley closure. 4,988,234, Cl. 405-36.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Schrader, Dieter; Giede, Karl; Schneider, Hans; and Mehl, Dietholf, 4,988,017, Cl. 222-130.000.
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Watkins, David S.; Dircks, Kenneth W.; and Epp, Danny G., 4,988,583, Cl. 429-30.000.
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Oppawsky, Steffen, 4,988,883, Cl. 250-492.100.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Elutriable multi component cracking catalyst mixture and a process for catalytic cracking of heavy hydrocarbon feed to lighter products. 4,988,653, Cl. 502-67.000.
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Herring, Sherry D. Insecticide. 4,988,516, Cl. 424-659.000.
Hersh, Stuart, to Electric Power Technologies, Inc. Smokeless ignitor. 4,988,286, Cl. 431-175.000.
Herweck, Steve A.; and Karwoski, Theodore, to Atrium Medical Corporation. Improved fluid recovery system. 4,988,342, Cl. 604-321.000.
Herzberg, Wolfgang. Device for reconnecting a broken bone. 4,988,350, Cl. 606-65.000.
Hesse, Friedhelm E., to Advanced Longwall Equipment, Inc. Repair of flight bars. 4,988,033, Cl. 228-119.000.
Heuser, Claus: *See*—
Dietrich, Walter; Ranke, Horst; Stumpp, Herman; and Heuser, Claus, 4,988,844, Cl. 219-121.170.
Heuts, Martinus P. J.: *See*—
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Hext, Trevor E. J.: *See*—
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Hey, H. Peter W.; Mazak, William A.; Aggarwal, Ravinder K.; and Curtin, John H., to Advanced Semiconductor Materials America, Inc. High throughput multi station processor for multiple single wafers. 4,987,856, Cl. 118-723.000.
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Beers, Howard L., 4,987,778, Cl. 73-449.000.
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Highsmith, Ronald E.; Good, Frederick J., Jr.; Lupton, Francis S.; Kehrer, Kenneth P.; and Petrie, Glenn E., to Polypure, Inc. Process for dewatering of biological sludge. 4,988,442, Cl. 210-609.000.
Higuchi, Yasushi: *See*—
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Hihara, Toshio; Shimizu, Kanzi; and Shimizu, Yukiharu, to Mitsubishi Kasei Corporation. Water soluble monoazo dye-stuffs containing vinylsulfone and halogenotriazine or difluoromonochloro pyrimidine type reactive groups. 4,988,801, Cl. 534-632.000.
Hilburger, Walter, to Daimler-Benz AG. Device for controlling a vehicle engine-braking system. 4,987,869, Cl. 123-323.000.
Hilkenmeier, Jurgen; and Volke, Hans W., to Protechno Ces GmbH & Co Kg. Matrix printing head with pivotable armatures. 4,988,223, Cl. 400-124.000.
Hill, Adrian R.; Burgess, Arthur E.; and Reeves, Barnaby C. Apparatus for quantifying visual function defects. 4,988,186, Cl. 351-239.000.
Hill, Francis U., to Sorrento Engineering, Inc. Method of improving foam fire resistance through the introduction of metal oxides thereinto. 4,988,739, Cl. 521-55.000.
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Hirano, Ryoichi: *See*—
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Kawamata, Yoshio; Ito, Syoichi; and Takagishi, Katsufumi, 4,989,163, Cl. 364-519.000.
Kyushima, Ichiro, 4,989,145, Cl. 364-419.000.
Matsuo, Akinori; Watanabe, Masashi; Fujimoto, Michio; Wada, Masashi; and Nagayama, Yoshiharu, 4,989,185, Cl. 365-230.020.
Miki, Sakae, 4,989,135, Cl. 364-200.000.
Nakamura, Shigeyoshi; Fukui, Yutaka; and Kashimura, Tetsuo, 4,988,266, Cl. 415-173.100.
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Yasuhara, Toshihiro; Masuda, Masachika; and Murakami, Gen, 4,989,068, Cl. 357-72.000.

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Franco, Christopher M. M.; Gandhi, Julia; Chatterjee, Sugata; Reddy, Goukanapalli C. S.; Ganguli, Bimal N.; Rupp, Richard H.; Kogler, Herbert; and Fehlhaber, Hans-Wolfram, 4,988,677, Cl. 514-30.000.
Heppke, Gerd; and Oestreicher, Feodor, 4,988,458, Cl. 252-299.630.
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Sternberger, Klaus; and Keil, Karl-Heinz, 4,988,365, Cl. 8-543.000.
Winkelmann, Detlef, 4,988,591, Cl. 430-43.000.

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Johnson, Robert E., 4,988,671, Cl. 505-1.000.

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Effland, Richard C.; Klein, Joseph T.; and Davis, Larry, 4,988,690, Cl. 514-213.000.

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Chen, Fang-Chung; and Franklin, Michael L., 4,988,630, Cl. 436-533.000.

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Schwab, Burkhard; and Jenkner, Erwin, 4,988,265, Cl. 414-796.800.

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Honda, Hironori: *See*—
Awajitani, Takahisa; Terasaka, Masayuki; Takemura, Masakazu; and Honda, Hironori, 4,988,589, Cl. 429-222.000.

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Langton, Richard G., 4,988,908, Cl. 310-331.000.
Phinney, Thomas L., 4,989,203, Cl. 370-85.130.

Hood, Leroy: *See*—
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Vidwans, Mohan P.; Parkinson, Susan H.; Scott, Glenn; and Fecteau, Anthony J., 4,988,134, Cl. 292-198.000.

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Kawasaki, Yoshio; Kishita, Yoshiaki; Horibe, Tatsutake; Fujii, Masakatsu; and Onoue, Keiji, 4,987,645, Cl. 19-25.000.

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Hornok, Laszlo : *See*—
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Horowitz, Steven L., to GTX Corporation. Method and apparatus for generating size and orientation invariant shape features. 4,989,257, Cl. 382-18.000.

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Hou, Jack. Transmission mechanism for music box ornament. 4,987,787, Cl. 74-49.000.
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Hu Lin Industrial Co., Ltd.: *See*—
Lin, Tsong-Chi, 4,987,640, Cl. 16-327.000.
Huang, George C.; and Zhu, Daniel, to Jing Tech, Inc. Continuous self-inking ribbon cartridge system. 4,988,225, Cl. 400-196.100.
Huang, Steve S.: *See*—
Jucha, Rhett B.; Davis, Cecil J.; Huang, Steve S.; Loewenstein, Lee M.; and Achenbach, Jeff D., 4,988,644, Cl. 437-225.000.
Huang, Tiao-Yuan; Chiang, Anne; and Wu, I-Wei, to Xerox Corporation. Method of fabrication a thin film SOI CMOS device. 4,988,638, Cl. 437-57.000.
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Hudetz, Michael L., to Solar Press, Inc. Packaging bag insert for folded publications. 4,988,124, Cl. 283-56.000.
Hudson, Wilbur G.; Schley, Ronald F.; and Tehrani, Joseph, to Lummus Development Corp. Perforator/crusher for plastic bottles. 4,987,829, Cl. 100-45.000.
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Moss, Gaylord E., 4,988,151, Cl. 350-3.660.
Rosen, Harold A.; and Thompson, James D., 4,989,011, Cl. 342-373.000.
Strittmatter, Donald J.; and Wickholm, David R., 4,988,175, Cl. 350-469.000.
Wreede, John E., 4,988,152, Cl. 350-3.700.
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Hull, Frank A.; and Archer, H. Brent, to Chesley F. Carlson Company. Proof light. 4,989,032, Cl. 355-38.000.
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Hult, Marvin H.: *See*—
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Human Industry Corporation: *See*—
Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, 4,988,271, Cl. 425-73.000.
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Humbert, Marvin H., to K. O. Lee Company. Endless belt valve grinder. 4,987,701, Cl. 51-145.00R.
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Wilson, Robert G., 4,987,929, Cl. 139-383.00A.
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ICI Resins b.v.: *See*—
Overbeek, Gerardus C.; and Heuts, Martinus P. J., 4,988,762, Cl. 524-839.000.
Ideal Instruments, Inc.: *See*—
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Iggulden, Jerry R.; and Streck, Donald A., to Light Ideas Incorporated. Facsimile record and playback system. 4,989,238, Cl. 379-100.000.
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Ihara Chemical Industry Co., Ltd.: *See*—
Ito, Shigekazu; Masuda, Katsumi; Kusano, Shoji; Nagata, Toshihiro; Kojima, Yoshiyuki; Sawai, Nobumitsu; and Maeno, Shin-ichiro, 4,988,704, Cl. 514-275.000.
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Iijima, Yasuo, to Kabushiki Kaisha Toshiba. Portable electronic apparatus. 4,988,855, Cl. 235-492.000.
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Imai, Soichiro: *See*—
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Imajo, Minori, to Nissan Motor Company, Ltd. Automotive trouble diagnosing system. 4,989,146, Cl. 364-424.040.

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Imperial Chemical Industries PLC: *See*—
Butters, Alan; and Page, Graham A., 4,988,572, Cl. 428-413.000.
Carr, Robin A. E.; and Powell, Lyn, 4,988,826, Cl. 549-445.000.

Implant Innovations, Inc.: *See*—
Lazzara, Richard J.; and Beaty, Keith D., 4,988,297, Cl. 433-173.000.
Lazzara, Richard J.; and Beaty, Keith D., 4,988,298, Cl. 433-173.000.

Inagaki, Hiroya: *See*—
Kotani, Matahira; Matsumoto, Masafumi; Matsumoto, Junichiro; Hayashi, Motohiko; Fujii, Mamoru; Yamanoue, Masafumi; Sakai, Katsuyuki; Mino, Kouichi; Murata, Naomitsu; Inagaki, Hiroya; and Kondo, Mitsunobu, 4,989,237, Cl. 379-100.000.

Inagaki, Masaji: *See*—
Tsuchiya, Kikuo; Inagaki, Masaji; and Araki, Shingo, 4,988,662, Cl. 503-208.000.

Inai, Yuichi: *See*—
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, 4,988,732, Cl. 514-560.000.

Ince, Peter R.: *See*—
Harding, Ian D.; Ince, Peter R.; and Preston, Roger S., 4,988,374, Cl. 65-2.000.

Industrial Fabricators Machine, Inc.: *See*—
Pettit, Delmer E., 4,988,231, Cl. 403-370.000.

Industrial Management Co.: *See*—
Rooklyn, Jack, 4,988,419, Cl. 204-157.420.

Industrial Technology Research Institute: *See*—
Chi, Guey-Fa; Cheng, Duen-Jen; and Yeh, Ying-Cheun, 4,987,879, Cl. 123-617.000.

Industrial Technology Research Institute, R.O.C.: *See*—
Wan, Shyue-Yun; Peng, Shie-Ming; and Wu, Der-Chwan, 4,989,246, Cl. 381-40.000.

Industrias Techno-Matic, S.A.: *See*—
Gabas, Carlos, 4,988,180, Cl. 350-641.000.

Industriestrasse: *See*—
Koss, Walter, 4,988,357, Cl. 623-11.000.

Information Storage Devices, Inc.: *See*—
Simko, Richard T., 4,989,179, Cl. 365-45.000.

Inmos Limited: *See*—
May, Michael D.; and Shepherd, Roger M., 4,989,133, Cl. 364-200.000.

Inoue, Manabu; and Okada, Hiroyuki, to Minolta Camera Kabushiki Kaisha. Camera with control apparatus for charging storage capacitor for flash light emission. 4,989,029, Cl. 354-418.000.

Inoue, Shigeru: *See*—
Takahashi, Kenji; Iwasaki, Katsuhiro; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; Yamada, Kenzo; and Kikuchi, Ichiro, 4,988,079, Cl. 266-156.000.

Institut Francais Du Petrole: *See*—
Ajot, Hubert; Freund, Edouard; and Grandvallet, Pierre, 4,988,626, Cl. 436-148.000.
Do, Anh T.; and Huvey, Michel, 4,988,128, Cl. 285-149.000.

Institute for Applied Biotechnology, The: *See*—
Branemark, Per-Ingvar, 4,988,299, Cl. 433-174.000.

Institute of Gas Technology: *See*—
Rush, William F.; Sadowski, Dennis L.; and Todres, Hyman A., 4,987,924, Cl. 137-614.180.

Instone, Terry: *See*—
Chambers, John G.; Instone, Terry; and Joy, Brian S., 4,988,453, Cl. 252-122.000.

Intelligent Surgical Lasers, Inc.: *See*—
Bille, Josef F., 4,988,348, Cl. 606-5.000.

Interlake, Inc.: *See*—
Kinney, Thomas R., 4,988,251, Cl. 414-276.000.

Interlego A.G.: *See*—
Knudsen, Jens N., 4,988,322, Cl. 446-120.000.
Ryaa, Jan; and Poulsen, Ole, 4,988,324, Cl. 446-383.000.

International Business Machines: *See*—
Mukherjee, Shyama P., 4,988,646, Cl. 501-98.000.

International Business Machines Corporation: *See*—
Bonneau, Martine; Boudon, Gerard; Le Garrec, Jean-Claude; Mollier, Pierre; and Wallart, Frank, 4,988,893, Cl. 307-279.000.
Chu, Albert M., 4,988,896, Cl. 307-452.000.
Dhong, Sang H.; and Hwang, Wei, 4,988,637, Cl. 437-52.000.
Dickerson, Jack A.; Greeson, James C., Jr.; and Poley, Neil M., 4,988,168, Cl. 350-339.00F.
Engler, Edward M.; Lee, Victor Y.; Nazzal, Adel I.; and Parkin, Stuart S. P., 4,988,668, Cl. 505-1.000.
Friedman, Robert M.; Randall, Grayson W.; Sheftic, Richard J.; and Spencer, David P., 4,989,139, Cl. 364-200.000.
Gonzalez-Lopez, Jorge, 4,988,984, Cl. 340-728.000.
Masleid, Robert P.; and Patel, Parsotam T., 4,988,636, Cl. 437-51.000.
Prame, Eric S., 4,988,997, Cl. 341-25.000.
Stone, Harold S., 4,989,131, Cl. 364-200.000.
Takahashi, Hiroyasu; and Yamashita, Akio, 4,989,258, Cl. 382-37.000.

International Flavors & Fragrances Inc.: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,988,532, Cl. 426-594.000.
Buckholz, Lawrence L., Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; Scharpf, Lewis G.; and Seitz, Eugene W., 4,988,527, Cl. 426-536.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,988,507, Cl. 424-84.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,988,508, Cl. 424-84.000.
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International Paper Company: *See*—
Tanner, Cynthia L.; and Whillock, Allan A., 4,988,546, Cl. 428-34.200.

Intini, Thomas D. Bend 'n peel child resistant/tamper evident blister package. 4,988,004, Cl. 206-532.000.

Inui, Shuji; Hayashi, Chikahisa; Kanai, Makoto; and Takahashi, Toshinori, to Toyoda Gosei Co., Ltd. Steering wheel. 4,988,973, Cl. 340-425.500.

Inventio AG: *See*—
Martin, Adolf H., 4,988,986, Cl. 340-815.010.

Ion Laser Technology: *See*—
Ostler, Kevin, 4,989,217, Cl. 372-107.000.

Iowa State University Research Foundation, Inc.: *See*—
Thompson, Philip H.; Burns, Stanley G.; and Weber, Robert J., 4,988,957, Cl. 331-107.00A.

Irvin Automotive Products, Inc.: *See*—
Hartmeyer, James, 4,988,119, Cl. 280-743.000.

Irwin, James, to Lucas Ledex Inc. Independent redundant force motor. 4,988,907, Cl. 310-181.000.

Isaka, Haruo: *See*—
Ishikawa, Akihiro; and Isaka, Haruo, 4,989,196, Cl. 369-54.000.

Ishibashi, Yoriyuki; Hirano, Ryoichi; and Yamashita, Kyoji, to Kabushiki Kaisha Toshiba. Method and apparatus for aligning two objects, and method and apparatus for providing a desired gap between two objects. 4,988,197, Cl. 356-349.000.

Ishida, Masahiro: *See*—
Kariya, Keiichrou; and Ishida, Masahiro, 4,988,047, Cl. 242-4.00R.

Ishida, Shunichiro: *See*—
Koshihara, Toshio; Ishihara, Koji; Hirashima, Toru; Ishida, Shunichiro; Okamoto, Haruhito; and Matoba, Yuji, 4,988,210, Cl. 374-5.000.

Ishida, Tokuji: *See*—
Hamada, Masataka; Ishida, Tokuji; and Ootsuka, Hiroshi, 4,988,856, Cl. 250-201.800.
Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, 4,989,094, Cl. 358-213.190.

Ishige, Osamu; Ninomiya, Hidetaka; Masukawa, Toyoaki; and Kohno, Junichi, to Konica Corporation. Silver halide color photographic light-sensitive material containing novel magenta couplers. 4,988,614, Cl. 430-552.000.

Ishigure, Atushi: *See*—
Yamaguchi, Masaaki; Kito, Masashi; Iguchi. Nobuhiro; Yoshida, Shingo; and Ishigure, Atushi, 4,988,300, Cl. 434-247.000.

Ishihara, Koji: *See*—
Koshihara, Toshio; Ishihara, Koji; Hirashima, Toru; Ishida, Shunichiro; Okamoto, Haruhito; and Matoba, Yuji, 4,988,210, Cl. 374-5.000.

Ishii, Haruo; Kohmoto, Shinsuke; and Nomura, Hiroshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Barrier mechanism of camera. 4,989,027, Cl. 354-253.000.

Ishii, Mitsuo; Kurata, Yukio; and Yamaoka, Hideyoshi, to Sharp Kabushiki Kaisha. Object lens driving device. 4,988,165, Cl. 350-245.000.

Ishii, Nobuyuki: *See*—
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Ishii, Shigeru, to Nissan Motor Co., Ltd. Line pressure control device for automatic transmission. 4,989,147, Cl. 364-424.100.

Ishikawa, Akihiro; and Isaka, Haruo, to Matsushita Electric Industrial Co., Ltd. Optical information recording apparatus. 4,989,196, Cl. 369-54.000.

Ishikawa, Kiyofumi; Fukami, Takehiro; Naganuma, Hiroshi; and Nakamichi, Kyoko, to Banyu Pharmaceutical Co., Ltd. Phosphinic acid derivatives. 4,988,681, Cl. 514-93.000.

Ishikawa, Shinzo: *See*—
Hara, Yojiro; Ishikawa, Shinzo; Shono, Hiroaki; and Matsumoto, Taiji, 4,988,492, Cl. 423-447.400.

Ishikawa, Takaaki: *See*—
Karasawa, Takumi; Tsukii, Michio; Atobe, Takashi; Ishikawa, Takaaki; and Mizuno, Kazuhiko, 4,988,857, Cl. 250-205.000.

Ishikawa, Toshiro: *See*—
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Ishikawa, Tuguo, to Kabushiki Kaisha Toshiba. Mobile communication system and its control method. 4,989,231, Cl. 379-59.000.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Yamashita, Seiya; and Sasaki, Haruo, 4,987,846, Cl. 114-265.000.

Ishima, Kazumi, to Ricoh Company, Ltd. Image reader for an image recording apparatus. 4,989,100, Cl. 358-483.000.

Isozumi, Shuzo: *See*—
Morishita, Akira; and Isozumi, Shuzo, 4,987,786, Cl. 74-7.00C.

Israel Aircraft Industries, Ltd.: *See*—
Cohen-Sabban, Yael L., 4,988,200, Cl. 356-376.000.

Itabashi, Takao: *See*—
Miyagawa, Masayuki; Itabashi, Takao; Yamada, Hisafumi; and Osakabe, Yoshio, 4,989,081, Cl. 358-93.000.

ITC, Incorporated: *See*—
Camarota, Richard J., 4,987,845, Cl. 114-253.000.

Ito, Akio, to Jeco Company Limited. Cross coil type instrument. 4,988,944, Cl. 324-154.0PB.

Ito, Hirokazu: *See*—
Kubo, Shinji; Funato, Ryo; Tajiri, Noriyuki; Ito, Hirokazu; and Iwasaki, Hitoshi, 4,988,794, Cl. 528-272.000.

Ito, Kiyotaka: *See*—
Kato, Masayuki; Nishino, Shigetaka; Ito, Kiyotaka; and Takasugi, Hisashi, 4,988,698, Cl. 514-284.000.

Ito, Noritsugu, to Brother Kogyo Kabushiki Kaisha. Printer having main and auxiliary pin tractor units. 4,988,226, Cl. 400-605.000.

Ito, Saburo, to Sanshin Kogyo Kabushiki Kaisha. Display system. 4,988,996, Cl. 340-984.000.

Ito, Shigekazu; Masuda, Katsumi; Kusano, Shoji; Nagata, Toshihiro; Kojima, Yoshiyuki; Sawai, Nobumitsu; and Maeno, Shin-ichiro, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. Pyrimidine derivative, process for preparing same and agricultural or horticultural fungicidal composition containing same. 4,988,704, Cl. 514-275.000.

Ito, Syoichi: *See*—
Kawamata, Yoshio; Ito, Syoichi; and Takagishi, Katsufumi, 4,989,163, Cl. 364-519.000.

Ito, Takanori, to Ricoh Company, Ltd. Color correction device and method having a hue area judgement unit. 4,989,079, Cl. 358-80.000.

Ito, Takanori, to Ricoh Company, Ltd. Color correction device with a hue area judgment unit to determine correction parameters. 4,989,080, Cl. 358-80.000.

Ito, Tetsuo: *See*—
Arita, Setsuo; Ito, Tetsuo; Suzuki, Satoshi; and Noguchi, Atomi, 4,989,129, Cl. 364-187.000.

Ito, Yoshiharu: *See*—
Maruyama, Isao; Fujiwara, Hiroshi; Ito, Yoshiharu; and Shigematsu, Hitoshi, 4,988,791, Cl. 528-168.000.

Ito, Yoshio, to Terumo Kabushiki Kaisha. Syringe pump apparatus. 4,988,337, Cl. 604-154.000.

Ito, Yukihiro; Kimura, Takashi; and Hoshika, Reiji, to Copal Co. Ltd. System for controlling the driving of a stepper motor. 4,988,938, Cl. 318-696.000.

Ito, Yukinobu, to Kabushiki Kaisha Toshiba. Solid-state image sensor device. 4,989,075, Cl. 358-41.000.

Itoh, Hiroshi: *See*—
Funahashi, Makoto; Itoh, Hiroshi; Takahashi, Tokuyuki; and Takada, Mitsuru, 4,987,798, Cl. 74-868.000.

Itoh, Kunio: *See*—
Fukuda, Takeshi; Fukushima, Motoo; Itoh, Kunio; and Fujiki, Hironao, 4,988,758, Cl. 524-492.000.

Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, to Sumitomo Electric Industries, Ltd. Method of forming oxide superconducting films by in-situ annealing. 4,988,670, Cl. 505-1.000.

ITT Corporation: *See*—
Muzslay, Steven Z., 4,988,307, Cl. 439-188.000.

Iversen, Arthur H.; and Whitaker, Stephan, to Coriolis Corporation. Modular heat sink structure. 4,989,070, Cl. 357-82.000.

Iwafuji, Yasuhiro: *See*—
Mori, Yasuki; Iwafuji, Yasuhiro; Mitsuyuki, Yoichiro; and Higashi, Tadatoshi, 4,988,918, Cl. 313-641.000.

Iwai, Shougo: *See*—
Kobayashi, Toshiaki; and Iwai, Shougo, 4,989,038, Cl. 355-202.000.

Iwakiri, Yasunori; and Moriyama, Akinobu, to Nissan Motor Company, Ltd. NOx concentration measuring apparatus. 4,988,428, Cl. 204-406.000.

Iwamatsu, Katsuyoshi: *See*—
Atsumi, Kunio; Iwamatsu, Katsuyoshi; Sakagami, Kenji; Ogino, Hiroko; and Yoshida, Takashi, 4,988,686, Cl. 514-203.000.

Iwaoka, Toshio: *See*—
Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,988,931, Cl. 318-293.000.

Iwasaki, Hitoshi: *See*—
Kubo, Shinji; Funato, Ryo; Tajiri, Noriyuki; Ito, Hirokazu; and Iwasaki, Hitoshi, 4,988,794, Cl. 528-272.000.

Iwasaki, Katsuhiro: *See*—
Takahashi, Kenji; Iwasaki, Katsuhiro; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; Yamada, Kenzo; and Kikuchi, Ichiro, 4,988,079, Cl. 266-156.000.

Iwasaki, Masaaki: *See*—
Moriyama, Junichi; and Iwasaki, Masaaki, 4,989,130, Cl. 364-200.000.

Iwasaki, Yoshihisa; and Kobayashi, Jun, to Maeda Industries, Ltd. Bicycle multiple chainwheel. 4,988,328, Cl. 474-160.000.

Iwata, Akihiko: *See*—
Shoda, Isao; Kodama, Hitoshi; Magome, Kazuo; Iwata, Akihiko; Yoshizawa, Kenji; and Taki, Masakazu, 4,988,922, Cl. 315-223.000.

Iwata, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Misfire detection device for an internal combustion engine. 4,987,771, Cl. 73-117.300.

Iwata, Yoshifumi: *See*—
Naruse, Yoshihiro; Kato, Hideharu; and Iwata, Yoshifumi, 4,989,244, Cl. 380-20.000.

Iwatani, Shiromitsu: *See*—
Sakaguchi, Haruo; Iwatani, Shiromitsu; and Okao, Toshikatsu, 4,987,949, Cl. 164-450.000.

Iyer, S. Raja; and Trikha, Sudhir K., to Acme Resin Corporation. Ester hardeners for phenolic resin binder systems. 4,988,745, Cl. 523-145.000.

Izumi Industries, Ltd.: *See*—
Suzuki, Yoshihiro; Ogiwara, Toshio; and Kudo, Masaaki, 4,987,867, Cl. 123-193.00P.

J. M. Huber Corporation: *See*—
Wason, Satish K., 4,988,561, Cl. 428-331.000.
Wason, Satish K., 4,988,757, Cl. 524-447.000.

J. M. Voith GmbH: *See*—
Meinecke, Albrecht; and Steiner, Karl, 4,988,410, Cl. 162-360.100.

Jackel, Janet L.; and Tomlinson, Walter J., III, to Bell Communications Research, Inc. Optical switch using bubbles. 4,988,157, Cl. 350-96.130.

Jackson, James D. J.; and Morgan, Derek E., to Micropore International Limited. Method of manufacturing coiled heating element. 4,987,675, Cl. 29-615.000.

Jackson, William P.: *See*—
Salmon, John A.; and Jackson, William P., 4,988,733, Cl. 514-575.000.

Jaen, Juan C.: *See*—
Caprathe, Bradley W.; Jaen, Juan C.; and Wise, Lawrence D., 4,988,699, Cl. 514-254.000.

Jagenberg Aktiengesellschaft: *See*—
Bensberg, Wolfgang, 4,988,330, Cl. 493-16.000.

Jagenberg Aktiengesellshaft: *See*—
Urban, Ernst-Gunther, 4,988,052, Cl. 242-56.400.

Jager, Gerhard; Kraatz, Udo; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, to Bayer Aktiengesellschaft. Fungicidal and plant growth-regulating cyclopropyl-hydroxyethyl-azolyl-derivatives. 4,988,383, Cl. 71-92.000.

Jamieson, John A., to Bussco Engineering, Inc. Printed circuit board stiffener. 4,988,577, Cl. 428-573.000.

Janer, Patrick, to Alcatel Transmission Par Faisceaus Hertziens A.T.F.H. Circuit for correcting group delay at microwave frequencies. 4,988,962, Cl. 333-28.00R.

Janke, Donald E.: *See*—
Zummer, Linda A.; Janke, Donald E.; and Giordano, James R., 4,987,637, Cl. 15-328.000.

Jansen, Henk: *See*—
Logtenberg, Harry; and Jansen, Henk, 4,987,641, Cl. 452-65.000.

Jansen, Herbert: *See*—
Miller, Luitpold; and Jansen, Herbert, 4,988,061, Cl. 246-182.00R.

Janson, Juergen; Gruber, Otto-Heinz; and Cosaert, Roland, to Messerschmitt-Boelkow-Blohm GmbH. Solar collector panel arrangement with partly and fully foldable panels. 4,988,060, Cl. 244-173.000.

Janssen, Adrian P.: *See*—
Turner, Andrew S.; Hext, Trevor E. J.; and Janssen, Adrian P., 4,988,159, Cl. 350-96.200.

Janssen Pharmaceutica N.V.: *See*—
Janssens, Frans E.; Diels, Gaston S. M.; and Pille, Geert M. E., 4,988,689, Cl. 514-212.000.

Janssens, Frans E.; Diels, Gaston S. M.; and Pille, Geert M. E., to Janssen Pharmaceutica N.V. ((Pharmacologically active bicyclic heterocyclic)methyl and -heteroatom) substituted hexahydro-1H-azepines and pyrrolidines. 4,988,689, Cl. 514-212.000.

Jansson, Lars G., to National Semiconductor Corporation. High speed ECL/CML to TTL translator circuit. 4,988,898, Cl. 307-475.000.

Jansson, Lars G., to National Semiconductor Corporation. TTL gate current source controlled overdrive and clamp circuit. 4,988,899, Cl. 307-475.000.

Japan Atomic Energy Research Institute: *See*—
Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, 4,988,130, Cl. 285-328.000.

Japan Aviation Electronics Industry, Limited: *See*—
Suzuki, Takao; Takekawa, Katsumi; Tokaichi, Tetsuro; and Umesato, Shoji, 4,988,312, Cl. 439-581.000.

Japan Electronic Control Systems Co., Ltd.: *See*—
Nakaniwa, Shinpei, 4,987,877, Cl. 123-494.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Takemura, Yasuhiko; Zen, Shinichiro; Zama, Yoshiaki; and Enyo, Hiroji, 4,988,548, Cl. 428-368.000.

Jarrold, Gregory S.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,988,880, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,988,881, Cl. 250-483.100.

Jarvenkyla, Jyri, to Uponor N.V., Emmaplein. Method and an apparatus for the production of ribbed pipes. 4,988,466, Cl. 264-40.100.

Jarvimaki, Kari; Heinonen, Mauno; and Koivisto, Juha, to Labsystems OY. Electrical pipette. 4,988,481, Cl. 422-100.000.

JE Hanger & Company Limited: *See*—
Cooper, John E., 4,988,361, Cl. 623-38.000.

Jeanes, Thomas O.; Summers, John D.; and Sanders, Edgar S., Jr., to Dow Chemical Company, The. Novel alicyclic polyimide gas separation membranes. 4,988,371, Cl. 55-16.000.

Jeco Company Limited: *See*—
Ito, Akio, 4,988,944, Cl. 324-154.0PB.

Jeffries, Bryce T.: *See*—
Adsey, Billy R.; Alworth, Charles W.; Durkee, John B.; and Jeffries, Bryce T., 4,987,914, Cl. 137-8.000.

Jelich, Klaus: *See*—
Findeisen, Kurt; Jelich, Klaus; and Hanssler, Gerd, 4,988,718, Cl. 514-363.000.

Jenkner, Erwin: *See*—
Schwab, Burkhard; and Jenkner, Erwin, 4,988,265, Cl. 414-796.800.

Jenn-Chyou, Shiao. Synchronous vehicle windshield wipe and defogger wiper mechanism. 4,987,636, Cl. 15-250.280.

Jensen, Thomas C.: *See*—
Johnson, Roger E.; Jensen, Thomas C.; and Brani, Robert A., 4,988,144, Cl. 296-192.000.

Jentsch, Christopher A.; and Spector, George. Newspaper basket. 4,988,039, Cl. 232-1.00C.

JEOL Ltd.: *See*—
Nagatsuka, Yoshitaka; Ohtsuki, Masayuki; Saito, Masaki; Yoshida, Koji; and Kawabe, Kazuyasu, 4,988,872, Cl. 250-310.000.

Jeong, Tae-sung, to Samsung Electronics, Co., Ltd. TTL to CMOS input buffer circuit. 4,988,897, Cl. 307-475.000.

Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Tsukahara, Akihiko; Iwaoka, Toshio; Yamaguchi, Yuichi; and Danzaki, Tsutomu, 4,988,931, Cl. 318-293.000.

Jing Tech, Inc.: *See*—
Huang, George C.; and Zhu, Daniel, 4,988,225, Cl. 400-196.100.

Joba, Lawrence R.: *See*—
Gatten, Ronald A.; and Joba, Lawrence R., 4,989,016, Cl. 346-1.100.

Jodai, Tetsuji: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,988,670, Cl. 505-1.000.

Johenning, Leon C., II: *See*—
Furrow, Edward D.; and Johenning, Leon C., II, 4,988,224, Cl. 400-194.000.

John Fluke Mfg. Co., Inc.: *See*—
Polstra, John D., 4,989,207, Cl. 371-16.200.

John Henry Company, The: *See*—
Diemer, Gordon J., 4,987,723, Cl. 53-399.000.

John Wyeth & Bro.: *See*—
Abou-Gharbia, Magid A.; Yardley, John P.; and Cliffe, Ian A., 4,988,814, Cl. 544-295.000.

Johnson, Bryce V.: *See*—
Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 4,988,656, Cl. 502-127.000.

Johnson, David J.; and Groghan, Charles L. Plunge jointer for planer knives. 4,987,704, Cl. 51-246.000.

Johnson, Donald S.: *See*—
Medford, George F.; and Johnson, Donald S., 4,988,779, Cl. 525-478.000.

Johnson, Jerome V. Fuel injection system. 4,987,878, Cl. 123-531.000.

Johnson, Peter N.: *See*—
Rayner, Bruce L.; and Johnson, Peter N., 4,988,982, Cl. 340-706.000.

Johnson, Robert E., to Hoechst Celanese Corp. Process for producing a superconductive complex metal oxide. 4,988,671, Cl. 505-1.000.

Johnson, Roger E.; Jensen, Thomas C.; and Brani, Robert A., to General Motors Corporation. Plenum and wiper module removable for engine service. 4,988,144, Cl. 296-192.000.

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Jones, C. Andrew: *See*—
Gelb, Morris; Leyshon, David W.; Sofranko, John A.; and Jones, C. Andrew, 4,988,830, Cl. 549-529.000.

Jones, David S.: *See*—
Srinivasan, Ananthachari; Fritzberg, Alan R.; and Jones, David S., 4,988,496, Cl. 424-1.100.

Jones, David W. Muscular stretching apparatus. 4,988,096, Cl. 272-118.000.

Jones, Peter: *See*—
Keyser, Paul; Jones, Peter; and Hubbard, John D., 4,988,550, Cl. 428-40.000.

Jones, William A.: *See*—
Coffey, Clayton G.; Jones, William A.; and Friend, William H., 4,989,007, Cl. 342-11.000.

Jongewaard, Susan K.; Elmasry, Mohamed A.; and Kidnie, Kevin M., to Minnesota Mining and Manufacturing Co. Liquid electrophotographic toner with acid containing polyester resins. 4,988,602, Cl. 430-115.000.

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Smith, Terrance P.; Zaklika, Krzysztof A.; Jongewaard, Susan K.; and Leichter, Louis M., 4,988,664, Cl. 503-227.000.

Jordan, David J. Hand tool for installing and removing rivets. 4,988,031, Cl. 227-63.000.

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Beran, Debra L.; Cann, Kevin J.; Jorgensen, Robert J.; Karol, Frederick J.; Maraschin, Norma J.; and Marcinkowsky, Arthur E., 4,988,783, Cl. 526-129.000.

Josquin, Wilhelmus J. M. J., to U.S. Philips Corporation. Method of manufacturing a semiconductor Bi-CMOS device. 4,988,633, Cl. 437-34.000.

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Kennedy, James V.; and Jossens, Lawrence W., 4,988,654, Cl. 502-84.000.

Joy, Brian S.: *See*—
Chambers, John G.; Instone, Terry; and Joy, Brian S., 4,988,453, Cl. 252-122.000.

Jucha, Rhett B.; Davis, Cecil J.; Huang, Steve S.; Loewenstein, Lee M.; and Achenbach, Jeff D., to Texas Instruments Incorporated. Method for etching semiconductor materials using a remote plasma generator. 4,988,644, Cl. 437-225.000.

Jugle, Don B.; Lindblad, Nero R.; and Pozniakas, Robert S., to Xerox Corporation. Cleaning apparatus for the reduction of agglomeration-caused spotting. 4,989,047, Cl. 355-297.000.

Jung, Werner; and Sievers, Axel, to BASF Lacke & Farben Aktiengesellschaft. Soluble crosslinkable acrylate copolymer, processes for its preparation and coating agents based upon the acrylate copolymer. 4,988,760, Cl. 524-555.000.

Jungersen, Thoger G. Wheelchair safety brakes. 4,987,978, Cl. 188-2.00F.

Junius, Martina: *See*—
Neumann, Ulrich; Junius, Martina; and Batz, Hans-Georg, 4,988,497, Cl. 424-7.100.

Jurin, Vitaly L.: *See*—
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

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Humbert, Marvin H., 4,987,701, Cl. 51-145.00R.

KabiVitrum AB: *See*—
Petho, Lajos; Håkansson, Ivan; and Månsson, Lennart, 4,987,726, Cl. 53-510.000.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Fujimoto, Shinji, 4,987,980, Cl. 192-3.280.

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Shibayama, Tooru; Watanabe, Tadashi; and Takahashi, Mitsuharu, 4,988,221, Cl. 400-61.000.

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Naruse, Yoshihiro; Kato, Hideharu; and Iwata, Yoshifumi, 4,989,244, Cl. 380-20.000.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Saiki, Shinichi; and Koide, Kiyoshi, 4,988,553, Cl. 428-99.000.

Kabushiki Kaisha Topcon: *See*—
Sakurai, Aki; and Nadachi, Ryoichi, 4,989,023, Cl. 354-62.000.

Kabushiki Kaisha Toshiba: *See*—
Hamoda, Keiji, 4,989,112, Cl. 360-137.000.
Hashimoto, Hidetsuna; Kato, Tiharu; and Tsuji, Hitoshi, 4,988,609, Cl. 430-326.000.
Horie, Hiroshi, 4,988,955, Cl. 331-11.000.
Iijima, Yasuo, 4,988,855, Cl. 235-492.000.
Ikenaga, Osamu, 4,989,156, Cl. 364-488.000.
Ishibashi, Yoriyuki; Hirano, Ryoichi; and Yamashita, Kyoji, 4,988,197, Cl. 356-349.000.
Ishikawa, Tuguo, 4,989,231, Cl. 379-59.000.
Ito, Yukinobu, 4,989,075, Cl. 358-41.000.
Kariya, Keiichrou; and Ishida, Masahiro, 4,988,047, Cl. 242-4.00R.
Kikuchi, Kouki, 4,988,304, Cl. 439-13.000.
Kodate, Hidemi; Kato, Takao; and Aoki, Shigeo, 4,987,913, Cl. 137-1.000.
Koshiyouji, Takashi; and Mori, Hiroyuki, 4,989,099, Cl. 358-474.000.
Miura, Tatsuyuki; and Ikemori, Kazuhiro, 4,989,041, Cl. 355-235.000.
Nagashima, Masayoshi; and Kawahara, Shinichi, 4,988,853, Cl. 235-475.000.
Nakanishi, Keiji; and Sekiguchi, Yasuyuki, 4,989,252, Cl. 381-71.000.
Nakayama, Koichi; and Gomei, Yoshio, 4,988,950, Cl. 328-235.000.
Nemoto, Junichiro, 4,989,235, Cl. 379-96.000.
Nuimura, Yoshimi, 4,989,151, Cl. 364-449.000.
Oaki, Junji, 4,989,161, Cl. 364-513.000.
Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, 4,988,130, Cl. 285-328.000.
Oda, Goro; Nagata, Niro; Nakatomi, Yoshitsugu; and Sawafuji, Takashi, 4,989,017, Cl. 346-76.0PH.
Ogawa, Tomihisa, 4,988,933, Cl. 318-561.000.
Ohto, Hideki, 4,989,264, Cl. 455-266.000.

Ono, Shoichi; Yokoo, Kuniyoshi; and Okamoto, Tadashi, 4,988,956, Cl. 331-86.000.
Takiba, Akira; Murata, Hiroyoshi; Suzuki, Yasoji; and Abe, Isao, 4,988,894, Cl. 307-296.100.
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,987,677, Cl. 29-846.000.
Ushirogouchi, Toru; Hayase, Shuji; Onishi, Yasunobu; and Horiguchi, Rumiko, 4,988,601, Cl. 430-192.000.
Yasuda, Satoshi; Wakayama, Shigeru; Tsukumo, Yoshiaki; Haraguchi, Takashi; and Egusa, Syun, 4,987,851, Cl. 118-403.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Kawasaki, Yoshio; Kishita, Yoshiaki; Horibe, Tatsutake; Fujii, Masakatsu; and Onoue, Keiji, 4,987,645, Cl. 19-25.000.

Kabushiki Kaisha Yakult Honsha: *See*—
Kimura, Minao; and No, Shinichiro, 4,988,435, Cl. 209-560.000.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Nagase, Takashi, 4,988,945, Cl. 324-175.000.

Kaczmarski, Wally L.; Watts, Verne W.; Loraas, Orlan J.; Vosberg, Curtis W.; and Mather, Joseph M., to Clark Equipment Company. Trenching attachment mounting method. 4,987,689, Cl. 37-195.000.

Kagechika, Hiroshi: *See*—
Ueno, Yasuhiro; Kagechika, Hiroshi; Watanabe, Itaru; Kosuge, Shigeyoshi; and Kojima, Toshifumi, 4,988,035, Cl. 228-175.000.

Kah, Carl L. C., Jr. Controller synchronization to a sequencing distributing valve. 4,987,917, Cl. 137-119.000.

Kajiwara, Junichi: *See*—
Matsuo, Toshihisa; Ougita, Kazuyuki; Kajiwara, Junichi; and Okuda, Masakiyo, 4,989,040, Cl. 355-218.000.

Kakita, Akira: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Kakiuchi, Takao: *See*—
Yamamoto, Hiroshi; Fujita, Tsutomu; Kakiuchi, Takao; Yano, Kousaku; Tanimura, Shuichi; and Fujii, Shinji, 4,988,423, Cl. 204-192.170.

Kakutani, Tetsu; Yamashita, Kenji; Ikenaka, yasuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Lymphotoxin DNA, lymphotoxin expression vector. 4,988,624, Cl. 435-320.100.

Kalash, Edwin: *See*—
Straub, Melvin J.; Kalash, Edwin; and Swenson, Douglas A., 4,987,940, Cl. 156-164.000.

Kambayashi, Taiji; Mekata, Hideyuki; Kataoka, Hiroyuki; and Kato, Chuzo, to Osaka Yuki Kagaku Kogyo Kabushiki Kaisha. Method for production of inclusion water for hardening gypsum, method for production of shaped article of gypsum, and shaped article of gypsum. 4,988,390, Cl. 106-774.000.

Kamiya, Masahiro: *See*—
Nemoto, Hiroyuki; Kamiya, Masahiro; and Shigetani, Tsunehisa, 4,988,559, Cl. 428-219.000.

Kamiya, Saburo, to Nikon Corporation. Projection exposure apparatus. 4,989,031, Cl. 355-30.000.

Kamuro, Setsufumi; Shibuya, Yoshiaki; and Ozu, Hiroyuki, to Sharp Kabushiki Kaisha. Pulse detecting device for detecting and outputting a pulse signal related to the slower frequency input pulse. 4,988,901, Cl. 307-518.000.

Kanai, Makoto: *See*—
Inui, Shuji; Hayashi, Chikahisa; Kanai, Makoto; and Takahashi, Toshinori, 4,988,973, Cl. 340-425.500.

Kanamori, Iwao; Kikuchi, Akira; and Okabe, Minoru, to Olympus Optical Co., Ltd. Optical system for endoscopes. 4,988,172, Cl. 350-413.000.

Kanayama, Hideyo, to NEC Corporation. Analog-to-digital converting unit for successive approximation. 4,989,004, Cl. 341-161.000.

Kaneda, Masayuki, to NEC Corporation. Fast divider for a constant divisor. 4,989,173, Cl. 364-764.000.

Kanegafuchi Kagaku Kabushiki Kaisha: *See*—
Uekita, Masakazu; and Awaji, Hiroshi, 4,988,795, Cl. 528-353.000.

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Kakutani, Tetsu; Yamashita, Kenji; Ikenaka, yasuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,988,624, Cl. 435-320.100.
Ueikita, Masakazu, 4,988,570, Cl. 428-411.100.

Kaneko, Kiyotaka, to Fuji Photo Film Co., Ltd. Camera automatically operable in a flash photographic mode for providing color-balanced images. 4,989,093, Cl. 358-213.190.

Kang, Doohee, to Air Products and Chemicals, Inc. Iron aluminides and nickel aluminides as materials for chemical air separation. 4,988,488, Cl. 423-210.500.

Kanjo, Yoshihiro: *See*—
Sugitani, Yuji; Kanjo, Yoshihiro; and Nishimura, Takanori, 4,988,201, Cl. 356-376.000.

Kanno, Yoshiaki: *See*—
Fujita, Hirokatsu; Kashiwabara, Kimito; and Kanno, Yoshiaki, 4,987,889, Cl. 123-492.000.

Kanota, Keiji: *See*—
Murabayashi, Noboru; and Kanota, Keiji, 4,989,102, Cl. 360-27.000.

Kao Corporation: *See*—
Nakashima, Norihiko; and Ueda, Sadashi, 4,988,663, Cl. 503-226.000.

Kao, Sun-Chueh; and Karol, Frederick J., to Union Carbide Chemicals and Plastics Company Inc. Catalyst for regulating the molecular weight distribution of ethylene polymers. 4,988,784, Cl. 526-133.000.

Kapec, Jeffrey; and Tanaka, Kazuna. Desktop computer terminal having an angularly adjustable electronic display module. 4,989,167, Cl. 364-708.000.

Karasaki, Toshihiko: *See*—
Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, 4,989,094, Cl. 358-213.190.

Karasawa, Taizo: *See*—
Nakaya, Tsunemoto; Karasawa, Taizo; Kihara, Nobuyuki; Wada, Yukihiro; and Kiyota, Masao, 4,988,529, Cl. 426-569.000.

Karasawa, Takumi; Tsukii, Michio; Atobe, Takashi; Ishikawa, Takaaki; and Mizuno, Kazuhiko, to Hitachi, Ltd. Misconvergence measuring apparatus. 4,988,857, Cl. 250-205.000.

Karayannis, Nicholas M.: *See*—
Arzoumanidis, Gregory G.; Karayannis, Nicholas M.; Khelghatian, Habet M.; Lee, Sam S.; and Johnson, Bryce V., 4,988,656, Cl. 502-127.000.

Kardefeldt, Bjorn; and Tjaderhane, Jan P. R., to Thorsman & Co. Aktiebolag. Method for fastening an attachment or suspension device and a device for carrying out the method. 4,988,249, Cl. 411-513.000.

Kariya, Keiichrou; and Ishida, Masahiro, to Kabushiki Kaisha Toshiba. Winding apparatus. 4,988,047, Cl. 242-4.00R.

Karlson, Eskil L. High efficiency ozone generator for sterilizing, bleaching and the like. 4,988,484, Cl. 422-186.190.

Karlsten, Karl-Ola; and Larsson, Bertil, to ESAB Aktiebolag. Contact tip for arc welding apparatus. 4,988,846, Cl. 219-137.610.

Karnin, Ehud D.: *See*—
Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz, 4,989,000, Cl. 341-107.000.

Karol, Frederick J.: *See*—
Beran, Debra L.; Cann, Kevin J.; Jorgensen, Robert J.; Karol, Frederick J.; Maraschin, Norma J.; and Marcinkowsky, Arthur E., 4,988,783, Cl. 526-129.000.
Kao, Sun-Chueh; and Karol, Frederick J., 4,988,784, Cl. 526-133.000.

Karwoski, Theodore: *See*—
Herweck, Steve A.; and Karwoski, Theodore, 4,988,342, Cl. 604-321.000.

Kasahara, Tatsuya; and Kishi, Kyuichi, to Konan Camera Research Institute, Inc. Eye movement inspection device. 4,988,183, Cl. 351-210.000.

Kasai, Kazumi, to Yoshida Kogyo K.K. Snap Buckle. 4,987,661, Cl. 24-625.000.

Kasai, Motoko, representative: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Kasai, Yoichi, deceased (by Kasai, Motoko, representative); Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, to Hoxan Corporation. Method of fabricating frozen fine liver piece for artificial liver, apparatus for freezing the same and freezing vessel. 4,987,921, Cl. 137-561.00R.

Kashimura, Tetsuo: *See*—
Nakamura, Shigeyoshi; Fukui, Yutaka; and Kashimura, Tetsuo, 4,988,266, Cl. 415-173.100.

Kashiwaba, Noriaki; Matsumoto, Hajime; Hosoda, Akihiko; and Sekine, Yasuo, to Fujirebio Kabushiki Kaisha. Phenoxypropyl derivatives. 4,988,828, Cl. 549-496.000.

Kashiwabara, Kimito: *See*—
Fujita, Hirokatsu; Kashiwabara, Kimito; and Kanno, Yoshiaki, 4,987,889, Cl. 123-492.000.

Kasler Corporation: *See*—
Kasler, Richard E.; and O'Bryan, Danny J., 4,988,233, Cl. 404-108.000.

Kasler, Richard E.; and O'Bryan, Danny J., to Kasler Corporation. Paving machine. 4,988,233, Cl. 404-108.000.

Kasuda, Takashi, to Pegasus Sewing Machine Co., Ltd. Upper feed adjusting mechanism for seing machine. 4,987,843, Cl. 112-320.000.

Kataoka, Hiroyuki: *See*—
Kambayashi, Taiji; Mekata, Hideyuki; Kataoka, Hiroyuki; and Kato, Chuzo, 4,988,390, Cl. 106-774.000.

Kataoka, Yasuo: *See*—
Hasegawa, Jun; Oikawa, Haruki; Kobayashi, Osamu; Kataoka, Yasuo; and Sekiya, Masayoshi, 4,988,568, Cl. 428-402.000.

Katayama, Kazuyori: *See*—
Mimura, Munehiko; Tatsumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,989,149, Cl. 364-426.040.

Katayama, Kenji; Ikeda, Tatsuji; Takeda, Toshio; and Shimada, Tomoichirou, to Mazda Motor Corporation. Control system for controlling spark timing of engine. 4,987,874, Cl. 123-422.000.

Katayose, Tsuyoshi; and Maehashi, Yukio, to NEC Corporation. Serial clock generating circuit. 4,989,223, Cl. 377-39.000.

Kato, Chuzo: *See*—
Kambayashi, Taiji; Mekata, Hideyuki; Kataoka, Hiroyuki; and Kato, Chuzo, 4,988,390, Cl. 106-774.000.

Kato Hatsujo Kaisha, Ltd.: *See*—
Sato, Seiichi, 4,987,656, Cl. 24-297.000.

Kato, Hideharu: *See*—
Naruse, Yoshihiro; Kato, Hideharu; and Iwata, Yoshifumi, 4,989,244, Cl. 380-20.000.

Kato, Kenshiro: *See*—
Yamada, Shigeki; Taniguchi, Motoaki; Takahashi, Masanobu; and Kato, Kenshiro, 4,987,939, Cl. 152-556.000.

Kato, Masayuki; Nishino, Shigetaka; Ito, Kiyotaka; and Takasugi, Hisashi, to Fujisawa Pharmaceutical Co., Ltd. 2(1H)-quinolinone

compounds and pharmaceutical composition comprising the same. 4,988,698, Cl. 514-284.000.

Kato, Nobuhisa: *See—*
Narahara, Mitsumasa; Yamauchi, Kazumi; Yatsuda, Yuji; Yasunaga, Shinichi; Moriguchi, Fujio; and Kato, Nobuhisa, 4,989,224, Cl. 377-39.000.

Kato, Takao: *See—*
Kodate, Hidemi; Kato, Takao; and Aoki, Shigeo, 4,987,913, Cl. 137-1.000.

Kato, Takeshi: *See—*
Shiokawa, Youichi; Takimoto, Koichi; Takenaka, Kohei; and Kato, Takeshi, 4,988,723, Cl. 514-392.000.

Kato, Tiharu: *See—*
Hashimoto, Hidetsuna; Kato, Tiharu; and Tsuji, Hitoshi, 4,988,609, Cl. 430-326.000.

Kato, Tomohiro; Takasu, Yoshio; and Minafuji, Makoto, to Takemoto Yushi Kabushiki Kaisha. Fluid-permeable agent for non-woven sheets of polyolefin fibers. 4,988,449, Cl. 252-8.800.

Katoh, Motoi: *See—*
Nishimura, Katsuhiko; Yamazaki, Michihito; Okano, Keiji; Katoh, Motoi; Suwa, Kouichi; Sato, Yasushi; and Nakahata, Kimio, 4,989,044, Cl. 355-251.000.

Katsu, Mutsuo: *See—*
Tanaka, Makoto; Katsu, Mutsuo; and Seki, Tadashi, 4,988,746, Cl. 524-12.000.

Katsuki, Koretoshi: *See—*
Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, 4,988,271, Cl. 425-73.000.

Katsuumi, Kazushige: *See—*
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, 4,988,631, Cl. 437-4.000.

Katz, Ira: *See—*
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,988,507, Cl. 424-84.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,988,508, Cl. 424-84.000.
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald A.; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,988,509, Cl. 424-84.000.

Kaufman, Arnold S., to Renco Systems, Inc. Roof mounted kitchen hood grease exhaust blowers. 4,987,882, Cl. 126-299.00D.

Kaule, Wittich: *See—*
Heckenkamp, Christoph; Stenzel, Gerhard; and Kaule, Wittich, 4,988,126, Cl. 283-92.000.

Kaulen, Johannes, to Bayer Aktiengesellschaft. Optically active oxiranes. 4,988,823, Cl. 549-14.000.

Kawabe, Kazuyasu: *See—*
Nagatsuka, Yoshitaka; Ohtsuki, Masayuki; Saito, Masaki; Yoshida, Koji; and Kawabe, Kazuyasu, 4,988,872, Cl. 250-310.000.

Kawahara, Shinichi: *See—*
Nagashima, Masayoshi; and Kawahara, Shinichi, 4,988,853, Cl. 235-475.000.

Kawaharada, Hajime: *See—*
Kakutani, Tetsu; Yamashita, Kenji; Ikenaka, yasuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,988,624, Cl. 435-320.100.

Kawakami, Katsura: *See—*
Gurd, John R.; and Kawakami, Katsura, 4,989,136, Cl. 364-200.000.

Kawakami, Masahiro: *See—*
Takahashi, Kenji; Iwasaki, Katsuhiro; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; Yamada, Kenzo; and Kikuchi, Ichiro, 4,988,079, Cl. 266-156.000.

Kawamata, Yoshio; Ito, Syoichi; and Takagishi, Katsufumi, to Hitachi, Ltd. Photo printer having a host computer assist function and method of controlling the same. 4,989,163, Cl. 364-519.000.

Kawamoto, Kazunori: *See—*
Kubokoya, Ryoichi; Higuchi, Yasushi; and Kawamoto, Kazunori, 4,989,064, Cl. 357-67.000.

Kawamura, Akio: *See—*
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Kawamura, Sukezo: *See—*
Toriyama, Motohiro; and Kawamura, Sukezo, 4,988,362, Cl. 623-66.000.

Kawasaki, Ikuya: *See—*
Nishimukai, Tadahiko; Hasegawa, Atsushi; Uchiyama, Kunio; Kawasaki, Ikuya; and Hanawa, Makoto, 4,989,140, Cl. 364-200.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Sakaguchi, Akira; Uchibe, Hisashi; and Tange, Toshiyuki, 4,988,032, Cl. 228-102.000.

Kawasaki Steel Corporation: *See—*
Hara, Yojiro; Ishikawa, Shinzo; Shono, Hiroaki; and Matsumoto, Taiji, 4,988,492, Cl. 423-447.400.

Kawasaki, Yoshio; Kishita, Yoshiaki; Horibe, Tatsutake; Fujii, Masakatsu; and Onoue, Keiji, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Automatic piecing of overlapped leading and trailing ends of slivers in a textile machine. 4,987,645, Cl. 19-25.000.

Kawase, Susumu: *See—*
Takeuchi, Fumikatsu; Takeuchi, Tsutomu; Osaka, Noriyuki; Takizawa, Yoichi; and Kawase, Susumu, 4,988,771, Cl. 525-276.000.

Kawauchi, Kazuyuki: *See—*
Takahashi, Hiromasa; Kawauchi, Kazuyuki; and Fujii, Shigeru, 4,989,062, Cl. 357-45.000.

Kawauchi, Masataka: *See—*
Sasaki, Shigeru; Kawauchi, Masataka; and Hamada, Yasunori, 4,988,849, Cl. 235-379.000.

Kawauchi, Yoshikazu; Miyama, Hiroshi; Tomii, Kaoru; and Nishida, Jun, to Matsushita Electric Industrial Co., Ltd. Flat configuration cathode ray tube. 4,988,913, Cl. 313-422.000.

Kazda, Stanislav: *See—*
Wehinger, Egbert; Meyer, Horst; Bosseret, Friedrich; Vater, Wulf; Towart, Robertson; Stoepel, Kurt; and Kazda, Stanislav, 4,988,717, Cl. 514-356.000.

Kearney & Trecker: *See—*
Sheldon, Paul C.; and Kirkham, Edward E., 4,988,244, Cl. 409-132.000.

Keating, James T.: *See—*
Perusich, Stephen A.; and Keating, James T., 4,988,364, Cl. 8-115.520.

Kehrer, Kenneth P.: *See—*
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Kinberg, Benjamin. Luminescent writing and display device. 4,988,301, Cl. 434-410.000.
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Kline, Joseph M. Identification marking system for dental instruments. 4,988,295, Cl. 433-141.000.
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Christensen, Stephen B.; Schulz, Gary J.; and Kling, Susan, 4,988,807, Cl. 536-127.000.
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Fulk, Clyde W., Jr., 4,988,445, Cl. 210-652.000.

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Kohn, Gabriel S., to Allied Healthcare Products, Inc. Electronic suction regulator. 4,988,336, Cl. 604-67.000.

Kohno, Akiyoshi: *See*—
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Ishige, Osamu; Ninomiya, Hidetaka; Masukawa, Toyoaki; and Kohno, Junichi, 4,988,614, Cl. 430-552.000.

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Ueno, Yasuhiro; Kagechika, Hiroshi; Watanabe, Itaru; Kosuge, Shigeyoshi; and Kojima, Toshifumi, 4,988,035, Cl. 228-175.000.

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Kok, Piet; Vanmaele, Luc J.; and Tavernier, Serge M., to Agfa-Gevaert, N.V. Particulate electrophotographic toner material. 4,988,600, Cl. 430-110.000.

Kokta, Milan R., to Union Carbide Chemicals and Plastics Company Inc. Processes for enhancing fluorescence of tunable titanium-doped oxide laser crystals. 4,988,402, Cl. 156-605.000.

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Kolbenschmidt Aktiengesellschaft: *See*—
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Kolycheck, Edmond G.: *See*—
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Komatsu, Takahiro: *See*—
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Komatsu Zenoah Co.: *See*—
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Komorita, Hiroshi: *See*—
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Komura, Masaru: *See*—
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Ishige, Osamu; Ninomiya, Hidetaka; Masukawa, Toyoaki; and Kohno, Junichi, 4,988,614, Cl. 430-552.000.
Maekawa, Yoshikazu; Muramatu, Takeshi; Yokoyama, Toshio; and Yukizane, Shigemi, 4,988,085, Cl. 270-53.000.
Muramatu, Takeshi; Sekiguchi, Masaaki; and Hirabayashi, Tsugio, 4,988,030, Cl. 227-27.000.
Takamuki, Yasuhiko; Habu, Takeshi; and Fukawa, Junichi, 4,988,603, Cl. 430-264.000.
Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, 4,988,598, Cl. 430-99.000.

Konig, Klaus: *See*—
Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.

Koninklijke Smeets Offset B.V.: *See*—
Kessels, Jac H. J.; and Weekers, Harry J. M., 4,987,691, Cl. 40-506.000.

Konishi, Hideo: *See*—
Tochio, Yoshiro; Saito, Satoshi; Hiraide, Masaki; Konishi, Hideo; Kuwabara, Hiroshi; and Kokura, Shiro, 4,988,968, Cl. 336-98.000.

Konishi, Yasuhiro: *See*—
Kumanoya, Masaki; Dosaka, Katsumi; Konishi, Yasuhiro; Komatsu, Takahiro; and Tobita, Youichi, 4,989,183, Cl. 365-222.000.

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Bessho, Akira; and Konno, Youichi, 4,989,197, Cl. 369-77.200.

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Koon, Terry D. Level indicator. 4,987,776, Cl. 73-304.00C.

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Bruning, Jurgen; Emberger, Roland; Guntert, Matthias; Hopp, Rudolf; Kopsel, Manfred; Sand, Theodor; and Werkhoff, Peter, 4,988,526, Cl. 426-535.000.

Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyar RT. Diphenylpropylamines for the therapy of heart disease. 4,988,730, Cl. 514-466.000.

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Kosaka, Hideyuki: *See*—
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,987,710, Cl. 52-167.0DF.
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Koshin Kenki Kogyo Co., Ltd.: *See*—
Shibuya, Akira; Aoyama, Michio; and Kimura, Isao, 4,988,208, Cl. 366-108.000.

Koshiyouji, Takashi; and Mori, Hiroyuki, to Kabushiki Kaisha Toshiba. Image information reading apparatus. 4,989,099, Cl. 358-474.000.

Koss, Walter, to Industriestrasse. Penis prosthesis. 4,988,357, Cl. 623-11.000.

Kossiakoff, Nicolas: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,988,532, Cl. 426-594.000.
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Ueno, Yasuhiro; Kagechika, Hiroshi; Watanabe, Itaru; Kosuge, Shigeyoshi; and Kojima, Toshifumi, 4,988,035, Cl. 228-175.000.

Kotake, Naoyuki: *See*—
Saito, Noboru; Kubo, Haruo; Kotake, Naoyuki; and Nagumo, Makoto, 4,988,129, Cl. 285-328.000.

Kotani, Matahira; Matsumoto, Masafumi; Matsumoto, Junichiro; Hayashi, Motohiko; Fujii, Mamoru; Yamanoue, Masafumi; Sakai, Katsuyuki; Mino, Kouichi; Murata, Naomitsu; Inagaki, Hiroya; and Kondo, Mitsunobu, to Sharp Kabushiki Kaisha. Image data transmission apparatus. 4,989,237, Cl. 379-100.000.

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Akiyama, Koichi, 4,988,184, Cl. 351-221.000.

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Tabuse, Hidetoshi, 4,987,964, Cl. 180-79.100.

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Jager, Gerhard; Kraatz, Udo; Dutzmann, Stefan; Brandes, Wilhelm; and Hanssler, Gerd, 4,988,383, Cl. 71-92.000.

Krag, Martin H.; and Pope, Malcolm H. Spinal fixation device. 4,987,892, Cl. 606-61.000.

Kramer, David C.: *See*—
Reynolds, John G.; and Kramer, David C., 4,988,433, Cl. 208-251.00R.

Kramer, Wolfgang; Weissmuller, Joachim; Holmwood, Graham; Berg, Dieter; Dutzmann, Stefan; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, to Bayer Aktiengesellschaft. Pesticides based on substituted aminomethylheterocyclic compounds. 4,988,729, Cl. 514-452.000.

Kransco: *See*—
Harrod, Lawrence R., 4,988,143, Cl. 296-177.000.

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Elbe, Hans-Ludwig; Kranz, Eckart; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,988,715, Cl. 514-383.000.

Kratz, Wilbur C.: *See*—
Nicholas, David M.; Bushinsky, Joseph P.; Kumar, Ravi; and Kratz, Wilbur C., 4,988,490, Cl. 423-351.000.

Krauss, Richard C.: *See*—
Kim, Kay K.; Krauss, Richard C.; and Orvik, Jon A., 4,988,812, Cl. 544-263.000.

Krawiecki, Madonna M.: *See*—
Pesheck, Peter S.; Atwell, William A.; Krawiecki, Madonna M.; and Anderson, George R., 4,988,841, Cl. 219-10.55M.

Kressner, Michael: *See*—
Hamprecht, Rainer; Kressner, Michael; and Pape, Georg, 4,988,752, Cl. 524-190.000.

Kretzmer, Paul D.: *See*—
Begin, John D.; Berry, James E.; and Kretzmer, Paul D., 4,989,155, Cl. 364-483.000.

Krigmont, Henry V.; and Coe, Everett L., Jr., to Wahlco, Inc. Removal of particulate matter from combustion gas streams. 4,987,839, Cl. 110-216.000.

Krishan, Thomas R.: *See*—
Smith, Frank P., II; Krishan, Thomas R.; and McAdams, Hugh P., Jr., 4,989,013, Cl. 343-721.000.

Krishnan, Kalyan V., to Teknekron Transportation Systems, Inc. Bar code reader. 4,988,852, Cl. 235-462.000.

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Beck, Fritz; Krohn, Holger; Wagner, Rainer; and Nann, Eberhard, 4,988,418, Cl. 204-153.100.

Kroupa, Richard F.; Willett, Thomas J.; and Tisdale, Glenn E., to Westinghouse Electric Corp. Passive ranging system especially for use with an electro-optical imaging system. 4,988,189, Cl. 356-4.000.

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Meyer, Daniel E.; Krueger, Dennis L.; and Bodaghi, Hassan, 4,988,560, Cl. 428-297.000.

Krukowski, Marilyn D.: *See*—
Eppley, Barry L.; Krukowski, Marilyn D.; and Osdoby, Philip A., 4,988,358, Cl. 623-16.000.

Krumboltz, Howard D.: *See*—
Bobb, Lloyd C.; and Krumboltz, Howard D., 4,988,863, Cl. 250-227.250.

Kubo, Haruo: *See*—
Saito, Noboru; Kubo, Haruo; Kotake, Naoyuki; and Nagumo, Makoto, 4,988,129, Cl. 285-328.000.

Kubo, Masahiko, to MITA Industrial Co., Ltd. Electrophotographic color toner having selected index of refraction range. 4,988,599, Cl. 430-109.000.

Kubo, Shinji; Funato, Ryo; Tajiri, Noriyuki; Ito, Hirokazu; and Iwasaki, Hitoshi, to Mitsubishi Rayon Company Limited. Polyester resin for toner and process for its production. 4,988,794, Cl. 528-272.000.

Kubokoya, Ryoichi; Higuchi, Yasushi; and Kawamoto, Kazunori, to Nippondenso Co., Ltd. Aluminum alloy line resistive to stress migration formed in semiconductor integrated circuit. 4,989,064, Cl. 357-67.000.

Kubota, Kazuo: *See*—
Sakaguchi, Masaaki; Kubota, Kazuo; and Ichikawa, Fusao, 4,988,204, Cl. 356-430.000.

Kubota, Shigeru; Masui, Katsue; Moriwaki, Toshimoto; and Andou, Torahiko, to Mitsubishi Denki Kabushiki Kaisha. Light-sensitive resin composition and light-sensitive element. 4,988,605, Cl. 430-270.000.

Kudo, Masaaki: *See*—
Suzuki, Yoshihiro; Ogiwara, Toshio; and Kudo, Masaaki, 4,987,867, Cl. 123-193.00P.

Kuhn, S.A.: *See*—
Kirch, Michel, 4,987,959, Cl. 172-124.000.

Kulesza, Ralph J.: *See*—
Kuna, Wayne A.; and Kulesza, Ralph J., 4,988,099, Cl. 273-1.0GF.

Kulpinski, Robert W.: *See*—
Lubinsky, Anthony R.; and Kulpinski, Robert W., 4,988,873, Cl. 250-327.200.

Kumahora, Hiroki: *See*—
Sadaoka, Noriyuki; Kumahora, Hiroki; and Miki, Kazuyoshi, 4,988,476, Cl. 376-245.000.

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Kumar, Anil: *See*—
Maulding, Donald R.; and Kumar, Anil, 4,988,824, Cl. 549-264.000.

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Nicholas, David M.; Bushinsky, Joseph P.; Kumar, Ravi; and Kratz, Wilbur C., 4,988,490, Cl. 423-351.000.

Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, to Human Industry Corporation. Apparatus for producing polyurethane foam. 4,988,271, Cl. 425-73.000.

Kumiai Chemical Industry Co., Ltd.: *See—*
Ito, Shigekazu; Masuda, Katsumi; Kusano, Shoji; Nagata, Toshihiro; Kojima, Yoshiyuki; Sawai, Nobumitsu; and Maeno, Shin-ichiro, 4,988,704, Cl. 514-275.000.

Kuna, Wayne A.; and Kulesza, Ralph J., to Wayne Kuna & Associates. Moving character action game. 4,988,099, Cl. 273-1.0GF.

Kunde, Klaus, to Bayer Aktiengeselischaft. Naphtholazophenylazoaminonaphthol compounds and copper complexes thereof. 4,988,805, Cl. 534-717.000.

Kundig, Peter: *See—*
Sicka, Richard W.; Tompkins, Dale A.; and Kundig, Peter, 4,987,808, Cl. 83-13.000.

Kunig, Horst E. Method and apparatus for selecting a physiologically standardized sensor of a multi-sensor electrocardiogram sensor set. 4,987,901, Cl. 128-696.000.

Kunimori-Kagaku Co., Ltd.: *See—*
Shiotani, Tadahiko; and Watanabe, I., 4,988,104, Cl. 273-167.00H.

Kuo, Sheafen F., to Frank Sheafen Kuo. Data processing system with mixed media memory packs. 4,989,191, Cl. 369-33.000.

Kuo, Wen T. Padlock. 4,987,753, Cl. 70-39.000.

Kuraoka, Yasuo: *See—*
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Kurata, Yukio; Ogata, Hiroshi; Nishihara, Hikaru; Tomura, Mitsuharu; and Tsuji, Shigeki, to Sharp Kabushiki Kaisha. Optical pickup apparatus and optical grating assembly therefor. 4,989,192, Cl. 369-44.120.

Kurata, Yukio: *See—*
Ishii, Mitsuo; Kurata, Yukio; and Yamaoka, Hideyoshi, 4,988,165, Cl. 350-245.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Okazaki, Susumu; Endo, Hiroshi; and Hino, Kuniaki, 4,988,569, Cl. 428-403.000.

Kures, Vasek J.: *See—*
Patel, Mansukh M.; Witkewitz, David; and Kures, Vasek J., 4,988,518, Cl. 426-5.000.

Kurihara, Hiroshi: *See—*
Yamashita, Masato; Enjyouji, Hideo; Kurihara, Hiroshi; Yamaguchi, Shoji; Shimizu, Hideto; Hashizume, Nichio; and Mori, Yasusuke, 4,989,154, Cl. 364-482.000.

Kurihara, Naoya, to Man Design Co., Ltd. Air compressor. 4,988,268, Cl. 417-312.000.

Kurimoto, Yukuo: *See—*
Kohno, Mitsunori; Umebara, Takao; Kurimoto, Yukuo; Fujii, Nobuhiko; and Akita, Hiromasa, 4,988,851, Cl. 235-462.000.

Kuriyama, Masaaki, to Minolta Camera Kabushiki Kaisha. Image projector apparatus having automatic focus control system. 4,988,187, Cl. 353-101.000.

Kuroda, Koji; and Nakatani, Shoji, to Fujitsu Limited. Multiplying unit in a computer system, capable of population counting. 4,989,168, Cl. 364-715.090.

Kuroda, Masami: *See—*
Hattori, Yoshimasa; Furusho, Noboru; Nakamura, Youichi; and Kuroda, Masami, 4,988,594, Cl. 430-59.000.

Kuroe, Shigeru; Takeda, Takayuki; and Sato, Masayasu, to Oki Electric Industry Co., Ltd. Apparatus for seeking a track of an optical disk in which information is recorded. 4,989,190, Cl. 369-32.000.

Kurtz, John L.: *See—*
Liang, Marc D.; Narayanan, Krishna; and Kurtz, John L., 4,989,253, Cl. 381-110.000.

Kurze, Hans-Juergen: *See—*
Fischer, Ulrich; Goeltenboth, Frank; Kurze, Hans-Juergen; and Wagner, Heinz, 4,988,002, Cl. 206-449.000.

Kusano, Shoji: *See—*
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Kussin, Richard F.: *See—*
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Kuster, Willi: *See—*
Blum, Richard; Groh, Hans-Michael; Kuster, Willi; and Schmidt, Ludwig, 4,988,008, Cl. 211-189.000.

Kusuda, Yasuhiro; Tottori, Takafumi; and Komura, Masaru, to Minolta Camera Kabushiki Kaisha. Multi-color image forming apparatus. 4,989,049, Cl. 355-326.000.

Kuwabara, Hiroshi: *See—*
Tochio, Yoshiro; Saito, Satoshi; Hiraide, Masaki; Konishi, Hideo; Kuwabara, Hiroshi; and Kokura, Shiro, 4,988,968, Cl. 336-98.000.

Kvanin, Vadim L.: *See—*
Merzhanov, Alexandr G.; Borovinskaya, Inna P.; Pitjulin, Alexandr N.; Ratnikov, Viktor I.; Epishin, Konstantin L.; and Kvanin, Vadim L., 4,988,480, Cl. 419-11.000.

Kwa, Peter T. H., to Northern Telecom Limited. Laser diode, method for making device and method for monitoring performance of laser diode. 4,989,214, Cl. 372-50.000.

Kyocera Corporation: *See—*
Hara, Shigeji; Yoshizawa, Takashi; Kinoshita, Kanae; Sakamoto, Masahiko; Terada, Mitsuhiro; and Suzuki, Youji, 4,988,194, Cl. 356-243.000.
Ikada, Yoshito; and Gen, Shokyu, 4,988,761, Cl. 524-557.000.

Kyodo Electric Co., Ltd.: *See—*
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Kyushima, Ichiro, to Hitachi, Ltd. Syntax analysis and language processing system. 4,989,145, Cl. 364-419.000.

La Jolla Cancer Research Foundation: *See—*
Ruoslahti, Erkki I.; Hayman, Edward G.; and Pierschbacher, Michael D., 4,988,621, Cl. 435-240.200.

La Telemecanique Electrique: *See—*
Dumont, Alain; and Le Faou, Philippe, 4,988,966, Cl. 335-273.000.

LaBelle, Gary E.; and Ask, David T., to Minnesota Mining and Manufacturing Company. Resistively heatable photothermographic element. 4,988,612, Cl. 430-531.000.

Labinal Components and Systems, Inc.: *See—*
Hopfer, Albert N., III; and Lindeman, Richard J., 4,988,306, Cl. 439-66.000.

Labsystems OY: *See—*
Jarvimaki, Kari; Heinonen, Mauno; and Koivisto, Juha, 4,988,481, Cl. 422-100.000.

Lacey, Simon J.; and Haworth, Roy, to Lucas Industries. Smoke measuring apparatus. 4,987,772, Cl. 73-117.300.

Lach, Jorge: *See—*
Barkans, Anthony C.; and Lach, Jorge, 4,988,985, Cl. 340-750.000.

Lachat, Michael J.: *See—*
Good, Stanley B.; La Fond, John A.; Lachat, Michael J.; and Shah, Dinesh B., 4,988,118, Cl. 280-743.000.

La Fond, John A.: *See—*
Good, Stanley B.; La Fond, John A.; Lachat, Michael J.; and Shah, Dinesh B., 4,988,118, Cl. 280-743.000.

Lagain, Daniel: *See—*
Andre , Jean-Denis; and Lagain, Daniel, 4,988,815, Cl. 546-159.000.

Lagas, Jan A.; Borsboom, Johannes; Berben, Pieter H.; and Geus, John W., to VEG-Gasinstituut N.V.; and Comprino, B.V. Process for recovering sulfur from sulfur-containing gases. 4,988,494, Cl. 423-574.00R.

Lagerqvist, Roger: *See—*
Dahlin, Ingemar; and Lagerqvist, Roger, 4,988,257, Cl. 414-420.000.

Lai, Vu A., to W. L. Gore & Associates, Inc. Retractable coiled electrical cable. 4,988,833, Cl. 174-69.000.

Lai, Wen-Chao; Rourke, William J.; and Natansohn, Samuel, to GTE Laboratories Incorporated. Process for recovering metal values such as scandium, iron and manganese from an industrial waste sludge. 4,988,487, Cl. 423-21.500.

Lailach, Gunter: *See—*
Wiederhoft, Gerhard; Bayer, Eckhard; Muller, Wolfgang D.; and Lailach, Gunter, 4,988,495, Cl. 423-616.000.

Lak, Khosrow: *See—*
Slayton, Danny L.; Tompkins, E. Neal; Lak, Khosrow; and Palm, Charles S., 4,989,045, Cl. 355-260.000.

Laks, Peter E., to Technological University. Method for treating wood against fungal attack. 4,988,545, Cl. 427-440.000.

Lalauze Rene : *See—*
Breuil, Philippe; Pijolat, Christophe; Tournier, Guy; and Lalauze Rene , 4,988,539, Cl. 427-126.300.

Lama, William L.: *See—*
Loce, Robert P.; Lama, William L.; and Nylen, Per S., 4,989,019, Cl. 346-108.000.

Lambert, Patrick M.: *See—*
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,988,880, Cl. 250-483.100.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,988,881, Cl. 250-483.100.

Lammers, Bryan G., to Caterpillar Inc. Final drive assembly. 4,988,329, Cl. 475-337.000.

Lammers, Matheus J. G.: *See—*
Doyle, Terence; Vriens, Leendert; and Lammers, Matheus J. G., 4,989,092, Cl. 358-140.000.

Landegren, Ulf; and Hood, Leroy, to California Institute of Technology. Method of detecting a nucleotide change in nucleic acids. 4,988,617, Cl. 435-6.000.

Landingham, Richard L.: *See—*
Holt, Joseph B.; Dunmead, Stephen D.; Halverson, Danny C.; and Landingham, Richard L., 4,988,645, Cl. 501-91.000.

Landreth, Christopher C.: *See—*
Adrian, Ronald J.; and Landreth, Christopher C., 4,988,191, Cl. 356-28.000.

Lange, Peter M.: *See—*
Mitschker, Alfred; Lange, Peter M.; Heller, Harold; Werner, Friedrich; Soest, Hans-Karl; and Siegers, Gunter, 4,988,738, Cl. 521-30.000.

Langfeld, Horst, to Ciba-Geigy Corporation. Polyazo dyes obtained by successive coupling of H-acid and two further anilinic diazo components on resorcinol or the like. 4,988,804, Cl. 534-684.000.

Langton, Richard G., to Honeywell Inc. Piezoelectric transducers for a ring laser gyroscope dither motor. 4,988,908, Cl. 310-331.000.

Lanier, Jaron Z.: *See—*
Zimmerman, Thomas G.; and Lanier, Jaron Z., 4,988,981, Cl. 340-709.000.

Laprade, Bruce N., to Galileo Electro-Optics Corp. Simultaneous positive and negative ion detector. 4,988,867, Cl. 250-281.000.
Laroche, Pierre: *See—*
Mottet, Leon-Philippe; Robyn, Pierre; and Laroche, Pierre, 4,988,647, Cl. 501-99.000.
Larson, Sherman L.: *See—*
Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., 4,988,042, Cl. 239-263.000.
Larson, Wayne F.: *See—*
Barrett, Philip D.; Henderson, Walter G.; and Larson, Wayne F., 4,988,987, Cl. 340-825.310.
Larsson, Bertil: *See—*
Karlsten, Karl-Ola; and Larsson, Bertil, 4,988,846, Cl. 219-137.610.
Latchways Limited: *See—*
Flux, Peter R., 4,988,248, Cl. 411-348.000.
Lathrop, Lane S.: *See—*
Chakravorty, Kishore K.; and Lathrop, Lane S., 4,988,413, Cl. 204-15.000.
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Macchio, Ralph A.; Slobody, Brent; and Russ, Julio G., to Revlon, Inc. Oil-in-water emulsions for foundation makeup composition. 4,988,503, Cl. 424-63.000.
Machonkin, Harold I.; and Kerr, Donald L., to Eastman Kodak Company. High contrast photographic element including an aryl sulfonamidophenyl hydrazide containing both thio and ethyleneoxy groups. 4,988,604, Cl. 430-264.000.
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Massey, Judy E. Method of constructing human-like costume heads. 4,987,615, Cl. 2-206.000.

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Hara, Yojiro; Ishikawa, Shinzo; Shono, Hiroaki; and Matsumoto, Taiji, 4,988,492, Cl. 423-447.400.

Matsumoto, Tokikazu, to Matsushita Electric Industrial Co., Ltd. Digital automatic gain control apparatus. 4,989,074, Cl. 358-21.00R.

Matsumura, Hiroshi: *See*—
Oka, Ryu-ichi; and Matsumura, Hiroshi, 4,989,249, Cl. 381-43.000.

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Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,987,677, Cl. 29-846.000.

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Nanyoshi, Yasutoshi; and Matsumura, Toshio, 4,987,770, Cl. 73-115.000.

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Ishikawa, Akihiro; and Isaka, Haruo, 4,989,196, Cl. 369-54.000.
Kawauchi, Yoshikazu; Miyama, Hiroshi; Tomii, Kaoru; and Nishida, Jun, 4,988,913, Cl. 313-422.000.
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Motegi, Takamasa, 4,988,991, Cl. 340-825.500.
Taguchi, Nobuyoshi; Imai, Akihiro; Murata, Yukichi; and Hirota, Takao, 4,988,666, Cl. 503-227.000.
Tsuruoka, Tosiaki; Maeoka, Tatsuo; and Nakamura, Masafumi, 4,988,958, Cl. 331-111.000.
Yamamoto, Hiroshi; Fujita, Tsutomu; Kakiuchi, Takao; Yano, Kousaku; Tanimura, Shuichi; and Fujii, Shinji, 4,988,423, Cl. 204-192.170.

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Gurd, John R.; and Kawakami, Katsura, 4,989,136, Cl. 364-200.000.

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Suzuki, Tatsuya; and Matsutani, Shunji, 4,989,026, Cl. 354-150.000.

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Fukuyama, Shun-ichi; Yoneda, Yasuhiro; Miyagawa, Masashi; Nishii, Kota; and Matsuura, Azuma, 4,988,514, Cl. 428-447.000.

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Beal, David E.; Dumont, John W., Jr.; and Matthews, Andrew S., 4,987,952, Cl. 165-16.000.

Matthews, W. Thomas; and Paalman, H. Hunter, to Dow Chemical Company, The. Process for regenerating ion exchange resins loaded with naphthenic and other organic acids. 4,988,737, Cl. 521-26.000.

Matthiessen, Hans, to Dragerwerk Aktiengesellschaft. Measuring cell for an electrochemical gas sensor. 4,988,429, Cl. 204-408.000.

Mattle, Helmut, to M & W Verpackungen Mildenberger & Willing GmbH & Co. Packing bag made from a film tube. 4,988,213, Cl. 383-6.000.

Mattle, Helmut, to M u. W Verpackungen Mildenberger u. Willing GmbH & Co. KG. Method for producing packing bags which can be stacked on a wicket. 4,988,332, Cl. 493-196.000.

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Maulding, Donald R.; and Kumar, Anil. Process for the preparation of 23-(C1-C6 alkyloxime)-LL-F28249 compounds. 4,988,824, Cl. 549-264.000.

Maurer, Ingo. Circuit arrangement for controlling the brightness of a lamp. 4,988,924, Cl. 315-291.000.

May, Lawrence A.: *See*—
DuBe, D. Robert; and May, Lawrence A., 4,988,294, Cl. 433-134.000.

May, Michael D.; and Shepherd, Roger M., to Inmos Limited. System for executing, scheduling, and selectively linking time dependent processes based upon scheduling time thereof. 4,989,133, Cl. 364-200.000.

Maye, Franklin H. Protective device for baseball player. 4,987,611, Cl. 2-19.000.

Mayer, Michael E.: *See*—
Scheuneman, James H.; Peirson, Paul L.; and Mayer, Michael E., 4,989,210, Cl. 371-40.100.

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Mazany, Anthony M.: *See*—
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Fujita, Nagahisa, 4,987,966, Cl. 180-197.000.
Katayama, Kenji; Ikeda, Tatsuji; Takeda, Toshio; and Shimada, Tomoichirou, 4,987,874, Cl. 123-422.000.
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McAdams, Hugh P., Jr.: *See*—
Smith, Frank P., II; Krishan, Thomas R.; and McAdams, Hugh P., Jr., 4,989,013, Cl. 343-721.000.

McAfee, Gregory J.: *See*—
Zuckerman, Ronald K.; and McAfee, Gregory J., 4,988,110, Cl. 273-286.000.

McBrien, Gregory J., to United Technologies Corporation. Pulse-driven accelerometer arrangement. 4,987,779, Cl. 73-517.00B.

McCanse, James E.: *See*—
McCanse, Richard L.; McCanse, James E.; and Fulmer, Timothy K., 4,987,733, Cl. 56-340.100.

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McClelland, John M.: *See*—
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McClusky, Stanley; and Boyd, Jerry L., 4,987,727, Cl. 53-525.000.

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Sivavec, Timothy M.; and McCormick, Sharon J., 4,988,775, Cl. 525-397.000.

McCracken, Alan, to Ciba-Geigy Corporation. Apparatus for the wetting of seeds. 4,987,850, Cl. 118-303.000.

McCreary, Charles H., to General Motors Corporation. Cam race for a roller clutch. 4,987,984, Cl. 192-45.000.

McCullough, Francis P., Jr.; Snelgrove, R. Vernon; and Goswami, Bhuvenesh C., to Dow Chemical Company, The. Process for forming an interlocked batting of carbonaceous fibers. 4,987,664, Cl. 28-103.000.

McCune, Robert C.: *See*—
Drawl, William R.; and McCune, Robert C., 4,988,421, Cl. 204-192.300.

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Martin, Shirley J.; Benham, Elizabeth A.; McDaniel, Max P.; and Gerhold, Bruce W., 4,988,657, Cl. 502-158.000.

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McFall, Robert M. Reciprocating conveyor loader. 4,988,253, Cl. 414-397.000.

McGarry, Patrick J., to Mars Incorporated. Method and apparatus for preventing pay telephone fraud and reducing handset vandalism. 4,989,239, Cl. 379-145.000.

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Smith, Robert W.; McIntyre, John J.; and Chow, Marland, 4,988,097, Cl. 272-119.000.

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Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., 4,988,042, Cl. 239-263.000.

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McNeely, Branch M., Jr. Drill stem arrangement and method. 4,987,961, Cl. 175-320.000.

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Mecherle, George S., to TRW, Inc. Laser diode phase modulation technique. 4,989,212, Cl. 372-26.000.

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Medford, George F.; and Johnson, Donald S., to General Electric Company. Addition cured silicone pressure sensitive adhesive. 4,988,779, Cl. 525-478.000.

Medical College of Ohio: *See*—
Morgan, Alan R.; and Selman, Steven H., 4,988,808, Cl. 540-145.000.

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Gaylord, John F., Jr.; and Dean, Susan L., 4,987,891, Cl. 128-87.00B.

Medicus, Christian: *See*—
Hinzpeter, Juergen; Medicus, Christian; and Franke, Siegfried, 4,988,275, Cl. 425-186.000.

Meditrac Ltd.: *See*—
Shtabholz, Ludwig, 4,987,885, Cl. 128-75.000.

Medtronic, Inc.: *See*—
Funke, Hermann D., 4,987,897, Cl. 128-419.0PG.

Mehl, Dietholf: *See*—
Schrader, Dieter; Giede, Karl; Schneider, Hans; and Mehl, Dietholf, 4,988,017, Cl. 222-130.000.

Meiji Milk Products Company Limited: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,988,456, Cl. 252-314.000.

Meiji Seika Kabushiki Kaisha: *See*—
Atsumi, Kunio; Iwamatsu, Katsuyoshi; Sakagami, Kenji; Ogino, Hiroko; and Yoshida, Takashi, 4,988,686, Cl. 514-203.000.

Meinecke, Albrecht; and Steiner, Karl, to J. M. Voith GmbH. Press section with two extended nip presses for the production of a fibrous web. 4,988,410, Cl. 162-360.100.

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Sakai, Tomoharu; Yoshida, Eizo; Mihara, Hiroshi; and Adachi, Toshio, 4,987,852, Cl. 118-603.000.

Meitec Corporation: *See*—
Yamaguchi, Masaaki; Kito, Masashi; Iguchi, Nobuhiro; Yoshida, Shingo; and Ishigure, Atushi, 4,988,300, Cl. 434-247.000.

Mejias, Andre , to Premiere de Tabbah SA. Dual-release fastener for strap ends. 4,987,654, Cl. 24-170.000.

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Kambayashi, Taiji; Mekata, Hideyuki; Kataoka, Hiroyuki; and Kato, Chuzo, 4,988,390, Cl. 106-774.000.

Melching, Uwe: *See*—
Welschlau, Udo; and Melching, Uwe, 4,988,051, Cl. 242-56.00R.

Melgaard, Hans L., to Despatch Industries, Inc. Material heating oven. 4,988,288, Cl. 432-72.000.

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Melleney, Derek A.; Reeves, David C.; and Potter, Michael, to De la Rue Systems Limited. Methods are apparatus for monitoring the diffuse reflectivity of a surface. 4,988,206, Cl. 356-446.000.

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Corrigan, Colin D.; Haley, Lawrence V.; and Menagh, Douglas P., 4,987,767, Cl. 73-23.360.

Merck & Co., Inc.: *See*—
Marburg, Stephen; and Tolman, Richard L., 4,988,625, Cl. 436-5.000.
Onishi, Janet C., 4,988,697, Cl. 514-252.000.

Merrell Dow Pharmaceuticals Inc.: *See*—
Halazy, Serge J.; and Danzin, Charles, 4,988,680, Cl. 514-81.000.

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Charbonneau, Jack W., 4,988,557, Cl. 428-204.000.
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Haynes, Douglas G., Jr., 4,988,370, Cl. 51-309.000.
Hedblom, Thomas P., 4,988,541, Cl. 427-163.000.
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Smith, Terrance P.; Zaklika, Krzysztof A.; Jongewaard, Susan K.; and Leichter, Louis M., 4,988,664, Cl. 503-227.000.
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Hamada, Masataka; Ishida, Tokuji; and Ootsuka, Hiroshi, 4,988,856, Cl. 250-201.800.
Inoue, Manabu; and Okada, Hiroyuki, 4,989,029, Cl. 354-418.000.
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Hayami, Hiroyuki, 4,988,162, Cl. 350-96.250.

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Ajika, Natsuo; and Arima, Hideaki, 4,988,635, Cl. 437-43.000.
Aoyagi, Toshitaka, 4,988,404, Cl. 156-651.000.
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Fujisaka, Takahiko; and Oh-hashi, Yoshimasa, 4,989,008, Cl. 342-25.000.
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Mitsubishi Jidosha Kogyo Kabushiki: *See*—
Fujita, Hirokatsu; Kashiwabara, Kimito; and Kanno, Yoshiaki, 4,987,889, Cl. 123-492.000.
Mitsubishi Kasei Corporation: *See*—
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Mizuno, Kazuhiko: *See*—
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Mochizuki, Hirohiko; Ohira, Tsuyoshi; Kodama, Yukinori; Kobayashi, Meiko; and Furuyama, Takaaki, to Fujitsu Limited. Dynamic random access memory having dummy word line for facilitating reset of row address latch. 4,989,182, Cl. 365-210.000.
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Moir, John. Clarification apparatus. 4,988,441, Cl. 210-522.000.
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Moreland, Jack, to MPC Containment Systems, Ltd. Airtight, watertight mechanical seam for joining panels of industrial strength fabrics. 4,987,657, Cl. 24-389.000.
Morgan, Alan R.; and Selman, Steven H., to University of Toledo, The; and Medical College of Ohio, part interest to each. Production and use of porphyrin derivatives and of compositions containing such derivatives. 4,988,808, Cl. 540-145.000.
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Narahara, Mitsumasa; Yamauchi, Kazumi; Yatsuda, Yuji; Yasunaga, Shinichi; Moriguchi, Fujio; and Kato, Nobuhisa, 4,989,224, Cl. 377-39.000.
Morimoto, Masafumi; Yoshida, Kunio; and Nakanishi, Tosaku, to Sharp Kabushiki Kaisha. Attachment connectable to electronic translator. 4,989,177, Cl. 364-900.000.
Morisawa, Tahei, to Asahi Kogaku Kogyo Kabushiki Kaisha. Apparatus for accurately positioning a magnetic recording and reproducing head. 4,989,109, Cl. 360-106.000.
Morishita, Akira; and Isozumi, Shuzo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial engine starter with spaced output shaft bearings. 4,987,786, Cl. 74-7.00C.
Morita, Kazuharu; Uchida, Shunji; and Yuasa, Kimihiro, to Idemitsu Kosan Company Limited. Ferroelectric liquid-crystalline polymeric composition. 4,988,460, Cl. 252-299.500.

Morita, Yutaka: *See*—
Fuse, Chihiro; and Morita, Yutaka, 4,989,240, Cl. 379-355.000.

Moriwaki, Toshimoto: *See*—
Kubota, Shigeru; Masui, Katsue; Moriwaki, Toshimoto; and Andou, Torahiko, 4,988,605, Cl. 430-270.000.

Moriya, Koichi: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,988,712, Cl. 514-340.000.

Moriya, Takashi: *See*—
Yamamoto, Tetsuya; Moriya, Takashi; and Tai, Yoshimasa, 4,988,222, Cl. 400-124.000.

Moriyama, Akinobu: *See*—
Iwakiri, Yasunori; and Moriyama, Akinobu, 4,988,428, Cl. 204-406.000.

Moriyama, Junichi; and Iwasaki, Masaaki, to Fujitsu Limited. System for determining and storing valid status information received from cross coupled unit. 4,989,130, Cl. 364-200.000.

Mormann, Werner; and Schmalz, Kerstin, to Bayer Aktiengesellschaft. Alternating copolymers, a process for their preparation, and a method of use thereof. 4,988,787, Cl. 526-262.000.

Morris, Ronald M.: *See*—
Eertink, Jan H.; Liem, Seeng D.; Malguzzi, Antonio; and Morris, Ronald M., 4,988,454, Cl. 252-140.000.

Morse, Mark J.; and Dominesey, Andrew E., to Eastman Kodak Company. Light-tight cassette. 4,988,054, Cl. 242-71.700.

Moser, Franz, to Steyr-Daimler-Puch AG. Supercharged internal combustion engine. 4,987,741, Cl. 60-599.000.

Moss, Gaylord E., to Hughes Aircraft Company. Method for making edge faded holograms. 4,988,151, Cl. 350-3.660.

Motegi, Takamasa, to Matsushita Electric Industrial Co., Ltd. Selective call receiving apparatus. 4,988,991, Cl. 340-825.500.

Motorola, Inc.: *See*—
Bush, Harry D., 4,988,943, Cl. 324-140.00D.
Gaw, Craig A.; and Moyer, Curtis D., 4,989,050, Cl. 357-17.000.
Gillig, Steven F.; and Pederson, Glen E., 4,989,230, Cl. 379-59.000.
Hawkins, George W., 4,989,069, Cl. 357-74.000.
Littlebury, High W.; and Swapp, Mavin C., 4,989,209, Cl. 371-22.100.
McCaslin, Shawn R.; Williams, Tim A.; and van Bavel, Nicholas R., 4,989,169, Cl. 364-724.090.
Pfiester, James R., 4,988,632, Cl. 437-31.000.

Mottet, Leon-Philippe; Robyn, Pierre; and Laroche, Pierre, to Glaverbel. Refractory mass and particles mixture for forming a refractory mass. 4,988,647, Cl. 501-99.000.

Moyer, Curtis D.: *See*—
Gaw, Craig A.; and Moyer, Curtis D., 4,989,050, Cl. 357-17.000.

MPC Containment Systems, Ltd.: *See*—
Moreland, Jack, 4,987,657, Cl. 24-389.000.

MTU Motoren-und Turbinen-Union Munchen GmbH: *See*—
Thoma, Martin, 4,988,415, Cl. 204-37.100.

Muchowski, Joseph M.; and Greenhouse, Robert, to Syntex (U.S.A.) inc. Intermediates for preparing 5-aroyl-1,2-dihydro-3H-pyrrolo(1,2-A)pyrrole-1,1-dicarboxylates. 4,988,822, Cl. 548-539.000.

Mueller, Donald E.; and Boyd, William A., to Westinghouse Electric Corp. Self-latching reactivity-reducing device for use in on-site spent fuel assembly storage. 4,988,473, Cl. 376-327.000.

Mueller, Karl-Heinz: *See*—
Buschhoff, Max; Plum, Hans; and Mueller, Karl-Heinz, 4,988,750, Cl. 524-181.000.

Mueller, Robert; Maier, Ulrich; and Raff, Friedrich, to Dr. Ing. H. C. F. Porsche Aktiengesellschaft. Shifting arrangement for an automatic transmission of a motor vehicle. 4,987,792, Cl. 74-473.00R.

Muhr, Gregory T.: *See*—
Bohling, David A.; Muhr, Gregory T.; and Roberts, David A., 4,988,640, Cl. 437-81.000.

Mukherjee, Shyama P., to International Business Machines. Method for producing a ceramic. 4,988,646, Cl. 501-98.000.

Mulder, James R.; and Eichman, Carl E., to Whirlpool Corporation. Removable cabinet top for front-serviceable appliance. 4,988,149, Cl. 312-223.000.

Muller, Andreas: *See*—
Hafele, Edelbert; Hardtl, Karl-Heinz; Muller, Andreas; and Schonauer, Ulrich, 4,988,970, Cl. 338-34.000.

Muller, Bruce R.: *See*—
Hall, Douglas O.; Frank, Lee F.; and Muller, Bruce R., 4,989,028, Cl. 354-324.000.

Muller, Friedemann: *See*—
Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, 4,988,748, Cl. 524-141.000.

Muller, Hanns-Peter: *See*—
Meyer, Rolf-Volker; Fahnler, Friedrich; Muller, Hanns-Peter; Wandel, Martin; and Heinz, Hans-Detlef, 4,988,549, Cl. 428-35.700.

Muller, Ingrid: *See*—
Scherowsky, Gunter; Gay, Jurgen; Dubal, Hans-Rolf; Escher, Claus; Hemmerling, Wolfgang; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,988,459, Cl. 252-299.610.

Muller, Jean M. Deck for wide-span bridge. 4,987,629, Cl. 14-6.000.

Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted 4-sulphonylamino-2-azinyl-1,2,4-triazol-3-ones. 4,988,381, Cl. 71-92.000.

Muller, Klaus-Helmut: *See*—
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.

Muller, Marcel: *See*—
Alig, Leo; and Muller, Marcel, 4,988,714, Cl. 514-357.000.

Muller, Wolfgang D.: *See*—
Wiederhoft, Gerhard; Bayer, Eckhard; Muller, Wolfgang D.; and Lailach, Gunter, 4,988,495, Cl. 423-616.000.

Murabayashi, Noboru; and Kanota, Keiji, to Sony Corporation. Apparatus for magnetically recording and/or reproducing digital signals in a plurality of modes having different formats. 4,989,102, Cl. 360-27.000.

Muraishi, Katsuaki, to Fuji Photo Film Co., Ltd. Recording medium magazine for electron microscopes. 4,988,874, Cl. 250-327.200.

Murakami, Azuma; Yamanami, Tsuguya; Funahashi, Takahiko; Senda, Toshiaki; Aoki, Kazuo; Siguyama, Keiichi; Miyamori, Nobuyuki; Kikuchi, Akio; and Abe, Manabu, to Wacom Co., Ltd. Position detecting device. 4,988,837, Cl. 178-18.000.

Murakami, Gen: *See*—
Yasuhara, Toshihiro; Masuda, Masachika; and Murakami, Gen, 4,989,068, Cl. 357-72.000.

Murakami Kameido Co., Ltd.: *See*—
Yamana, Tohru; and Kikuchi, Toshiaki, 4,988,068, Cl. 248-484.000.

Murakami, Yoshio: *See*—
Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, 4,988,130, Cl. 285-328.000.

Muramatsu, Masanori; and Sugiura, Takashi, to Canon Kabushiki Kaisha. Image synthesizing apparatus. 4,989,042, Cl. 355-244.000.

Muramatu, Takeshi; Sekiguchi, Masaaki; and Hirabayashi, Tsugio, to Konica Corporation. Printed recording paper processing apparatus. 4,988,030, Cl. 227-27.000.

Muramatu, Takeshi: *See*—
Maekawa, Yoshikazu; Muramatu, Takeshi; Yokoyama, Toshio; and Yukizane, Shigemi, 4,988,085, Cl. 270-53.000.

Murari, Bruno: *See*—
Storti, Sandro; Murari, Bruno; and Consiglieri, Franco, 4,989,114, Cl. 361-84.000.

Murata, Hiroyoshi: *See*—
Takiba, Akira; Murata, Hiroyoshi; Suzuki, Yasoji; and Abe, Isao, 4,988,894, Cl. 307-296.100.

Murata Kikai Kabushiki Kaisha: *See*—
Konishi, Yuji, 4,988,049, Cl. 242-35.50R.
Tone, Shoichi, 4,988,050, Cl. 242-35.6OR.
Yamamoto, Yoshio; and Nagasawa, Isao, 4,988,252, Cl. 414-331.000.

Murata Mfg. Co., Ltd.: *See*—
Masuda, Noboru; Oosawa, Tetsuo; and Tomaki, Kenji, 4,988,850, Cl. 235-449.000.
Nishioka, Goro; Watanabe, Shuuji; and Sakabe, Yukio, 4,988,468, Cl. 264-65.000.
Nishioka, Goro; Sakabe, Yukio; and Yamada, Masayuki, 4,988,651, Cl. 501-135.000.
Takagi, Hiroshi; and Sakabe, Yukio, 4,988,650, Cl. 501-134.000.

Murata, Naomitsu: *See*—
Kotani, Matahira; Matsumoto, Masafumi; Matsumoto, Junichiro; Hayashi, Motohiko; Fujii, Mamoru; Yamanoue, Masafumi; Sakai, Katsuyuki; Mino, Kouichi; Murata, Naomitsu; Inagaki, Hiroya; and Kondo, Mitsunobu, 4,989,237, Cl. 379-100.000.

Murata, Yukichi: *See*—
Taguchi, Nobuyoshi; Imai, Akihiro; Murata, Yukichi; and Hirota, Takao, 4,988,666, Cl. 503-227.000.

Murphy, Patrick J.: *See*—
Svenkeson, John W.; and Murphy, Patrick J., 4,988,305, Cl. 439-65.000.

Murphy, Walter T.; Tseng, Hsiungto S.; and Kolycheck, Edmond G., to B. F. Goodrich Company, The. Thermoplastic polyurethanes having improved binder properties for magnetic media recording. 4,988,574, Cl. 428-425.900.

Murray, Michael T.: *See*—
Markis, William R.; Papa, James M.; and Murray, Michael T., 4,988,932, Cl. 318-560.000.

Murray, Wayne J., to Summagraphics Corporation. Digitizer tablet with integral storage. 4,988,836, Cl. 178-18.000.

Musashino Tuko Co., Ltd.: *See*—
Tochio, Yoshiro; Saito, Satoshi; Hiraide, Masaki; Konishi, Hideo; Kuwabara, Hiroshi; and Kokura, Shiro, 4,988,968, Cl. 336-98.000.

Mutsaers, Cornelis A. H. A.: *See*—
Severin, Jan W.; De With, Gijsbertus; De Leeuw, Dagobert M.; and Mutsaers, Cornelis A. H. A., 4,988,672, Cl. 505-1.000.

Muzslay, Steven Z., to ITT Corporation. Circuit shorting connector. 4,988,307, Cl. 439-188.000.

Myers, Charles J.: *See*—
Harner, Richard S.; and Myers, Charles J., 4,988,155, Cl. 350-96.100.

Myers, Daniel N.: *See*—
Sechrist, Paul A.; Lomas, David A.; and Myers, Daniel N., 4,988,430, Cl. 208-113.000.

Myers, Jeff D. Photographic gun. 4,989,024, Cl. 354-76.000.

Myers, Sherri L.: *See*—
Kinstedt, George C.; and Myers, Sherri L., 4,988,452, Cl. 252-99.000.

Myllymaki, Matti, to Sostel Oy. Transmission system for telephone communications or data transfer. 4,989,236, Cl. 379-98.000.

Nabisco Brands, Inc.: *See*—
Moeller, Gerth, 4,988,276, Cl. 425-290.000.

Nadachi, Ryoichi: *See*—
Sakurai, Aki; and Nadachi, Ryoichi, 4,989,023, Cl. 354-62.000.

Nadolink, Richard H., to United States of America, Navy. System for reducing drag and noise of underwater vehicles. 4,987,844, Cl. 114-20.100.

Nafti, David I. Device for imparting multi-directional rocking motion. 4,987,624, Cl. 5-109.000.

Nagafuji, Yoshiharu: *See*—
Shinohara, Takayoshi; Kobayashi, Kiyotaka; and Nagafuji, Yoshiharu, 4,987,824, Cl. 91-369.100.

Nagai, Hiroo: *See*—
Taguchi, Toshihiko; Asano, Shozo; Osawa, Ken'ichi; Nagai, Hiroo; and Ikeda, Hisao, 4,988,395, Cl. 148-24.000.

Nagaishi, Hatsuo, to Nissan Motor Co., Ltd. Fuel injection control system for internal combustion engine. 4,987,890, Cl. 123-492.000.

Nagami, Katsuyoshi: *See*—
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Nagamine, Ryoji: *See*—
Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, 4,988,271, Cl. 425-73.000.

Naganuma, Hiroshi: *See*—
Ishikawa, Kiyofumi; Fukami, Takehiro; Naganuma, Hiroshi; and Nakamichi, Kyoko, 4,988,681, Cl. 514-93.000.

Naganuma, Masamitsu: *See*—
Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, 4,988,130, Cl. 285-328.000.

Nagao, Hisao: *See*—
Kihara, Seiichiro; Tani, Zenpei; and Nagao, Hisao, 4,988,895, Cl. 307-359.000.

Nagaoka, Satoshi: *See*—
Ohki, Nobutaka; Naruse, Hideaki; Nagaoka, Satoshi; and Hanaki, Kouichi, 4,988,613, Cl. 430-547.000.

Nagasaki, Tatsuo: *See*—
Nishioka, Kimihiko; Ogiu, Hisao; and Nagasaki, Tatsuo, 4,987,884, Cl. 128-6.000.

Nagasawa, Isao: *See*—
Yamamoto, Yoshio; and Nagasawa, Isao, 4,988,252, Cl. 414-331.000.

Nagasawa, Makoto; and Miwa, Hideyuki, to Fuji Electric Co., Ltd. Fuel cell power generating apparatus and method for controlling the apparatus. 4,988,283, Cl. 429-17.000.

Nagase, Takashi, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Optical and magnetic encoder for serially transmitting absolute position signals with an auxiliary power supply. 4,988,945, Cl. 324-175.000.

Nagashima, Masayoshi; and Kawahara, Shinichi, to Kabushiki Kaisha Toshiba. Ticket checking/issuing apparatus in which friction holds a ticket while recording/reproducing data. 4,988,853, Cl. 235-475.000.

Nagashima, Yoshitake: *See*—
Owada, Mitsuru; Tajima, Mizuho; and Nagashima, Yoshitake, 4,989,076, Cl. 358-61.000.

Nagata, Niro: *See*—
Oda, Goro; Nagata, Niro; Nakatomi, Yoshitsugu; and Sawafuji, Takashi, 4,989,017, Cl. 346-76.0PH.

Nagata, Toshihiro: *See*—
Ito, Shigekazu; Masuda, Katsumi; Kusano, Shoji; Nagata, Toshihiro; Kojima, Yoshiyuki; Sawai, Nobumitsu; and Maeno, Shin-ichiro, 4,988,704, Cl. 514-275.000.

Nagatsuka, Yoshitaka; Ohtsuki, Masayuki; Saito, Masaki; Yoshida, Koji; and Kawabe, Kazuyasu, to JEOL Ltd. Electron probe microanalyzer having wavelength-dispersive x-ray spectrometer and energy-dispersive x-ray spectrometer. 4,988,872, Cl. 250-310.000.

Nagatsuna, Shinji, to Ricoh Company, Ltd. Device for driving a rotary body. 4,989,037, Cl. 355-200.000.

Nagayama, Yoshiharu: *See*—
Matsuo, Akinori; Watanabe, Masashi; Fujimoto, Michio; Wada, Masashi; and Nagayama, Yoshiharu, 4,989,185, Cl. 365-230.020.

Nagumo, Makoto: *See*—
Saito, Noboru; Kubo, Haruo; Kotake, Naoyuki; and Nagumo, Makoto, 4,988,129, Cl. 285-328.000.

Nagy, Gabor: *See*—
Szekely, Tamas; Nagy, Gabor; Danko, Andras; Szepvolgyi, Janos; Gal, Andras; and Libor, Oszkar, 4,988,238, Cl. 405-263.000.

Nagy nee Hegyi, Gyongyver: *See*—
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Naito, Yasuo: *See*—
Mimura, Munehiko; Tatsumi, Takumi; Naito, Yasuo; and Katayama, Kazuyori, 4,989,149, Cl. 364-426.040.

Najmolhoda, Hamid, to Hi-Ram, Inc. Proportional variable force solenoid control valve. 4,988,074, Cl. 251-129.080.

Naka, Yoji; and Yoshida, Yutaka, to Fuji Photo Film Co., Ltd. Program shutter drive system. 4,989,030, Cl. 354-435.000.

Nakagawa, Susumu; Mitomo, Ryuji; and Ushijima, Ryosuke, to Banyu Pharmaceutical Company, Ltd. Cephalosporin derivatives, and antibacterial agents. 4,988,687, Cl. 514-206.000.

Nakagawa, Torru: *See*—
Okesaku, Masahiro; Miyahara, Michito; Ataka, Ryosuke; and Nakagawa, Torru, 4,987,930, Cl. 139-435.500.

Nakahama, Tadamitsu: *See*—
Tanimoto, Yoshio; Nakahama, Tadamitsu; Yamane, Takakazu; and Masuda, Shunji, 4,988,537, Cl. 427-46.000.

Nakahashi, Hiroaki; Saya, Tsutomu; and Yamazaki, Junichi, to Mabuchi Motor Company, Ltd. Miniature motor with a worm reduction gear. 4,987,791, Cl. 74-425.000.

Nakahata, Kimio: *See*—
Nishimura, Katsuhiko; Yamazaki, Michihito; Okano, Keiji; Katoh, Motoi; Suwa, Kouichi; Sato, Yasushi; and Nakahata, Kimio, 4,989,044, Cl. 355-251.000.

Nakajima, Mutsuo: *See*—
Hagimura, Atsushi; and Nakajima, Mutsuo, 4,988,909, Cl. 310-358.000.

Nakamatsu, Yoshiro. Apparatus for increasing the activity of the human brain. 4,987,896, Cl. 128-399.000.

Nakamichi, Kyoko: *See*—
Ishikawa, Kiyofumi; Fukami, Takehiro; Naganuma, Hiroshi; and Nakamichi, Kyoko, 4,988,681, Cl. 514-93.000.

Nakamura, Kazuyuki: *See*—
Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, 4,988,130, Cl. 285-328.000.

Nakamura, Masafumi: *See*—
Tsuruoka, Tosiaki; Maeoka, Tatsuo; and Nakamura, Masafumi, 4,988,958, Cl. 331-111.000.

Nakamura, Nobuo: *See*—
Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, 4,989,162, Cl. 364-513.000.

Nakamura, Shigeyoshi; Fukui, Yutaka; and Kashimura, Tetsuo, to Hitachi, Ltd. Gas turbine and shroud for gas turbine. 4,988,266, Cl. 415-173.100.

Nakamura, Takashi; Tanaka, Naoki; Iijima, Hitoshi; and Sumida, Yoshihiro, to Mitsubishi Denki Kabushiki Kaisha. Air conditioning device. 4,987,747, Cl. 62-160.000.

Nakamura, Takashi; and Yamaura, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Detector for use on sewing machine. 4,987,842, Cl. 112-275.000.

Nakamura, Youichi: *See*—
Hattori, Yoshimasa; Furusho, Noboru; Nakamura, Youichi; and Kuroda, Masami, 4,988,594, Cl. 430-59.000.

Nakane, Masayoshi: *See*—
Watanabe, Mitsuaki; and Nakane, Masayoshi, 4,988,887, Cl. 250-572.000.

Nakanishi, Keiji; and Sekiguchi, Yasuyuki, to Kabushiki Kaisha Toshiba. Silencer. 4,989,252, Cl. 381-71.000.

Nakanishi, Tosaku: *See*—
Morimoto, Masafumi; Yoshida, Kunio; and Nakanishi, Tosaku, 4,989,177, Cl. 364-900.000.

Nakanishi, Yoshimi: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Nakaniwa, Shinpei, to Japan Electronic Control Systems Co., Ltd. Method and apparatus for detecting intake air state quantity in an internal combustion engine. 4,987,877, Cl. 123-494.000.

Nakano, Hiroshi: *See*—
Yoneda, Takao; Nakano, Hiroshi; and Yonezu, Toshihiro, 4,988,937, Cl. 318-675.000.

Nakashima, Norihiko; and Ueda, Sadashi, to Kao Corporation. Heat sensitive paper. 4,988,663, Cl. 503-226.000.

Nakatani, Shoji: *See*—
Kuroda, Koji; and Nakatani, Shoji, 4,989,168, Cl. 364-715.090.

Nakatomi, Yoshitsugu: *See*—
Oda, Goro; Nagata, Niro; Nakatomi, Yoshitsugu; and Sawafuji, Takashi, 4,989,017, Cl. 346-76.0PH.

Nakaya, Tsunemoto; Karasawa, Taizo; Kihara, Nobuyuki; Wada, Yukihiro; and Kiyota, Masao, to Nissei Kabushiki Kaisha. Milk shake and manufacturing method thereof. 4,988,529, Cl. 426-569.000.

Nakayama, Koichi; and Gomei, Yoshio, to Kabushiki Kaisha Toshiba. Electron synchrotron accelerating apparatus. 4,988,950, Cl. 328-235.000.

Nakayama, Masatoshi; Ueda, Kunihiro; and Okamura, Masatoshi, to TDK Corporation. Medium related members. 4,988,573, Cl. 428-421.000.

Namba, Hideyuki, to Fujitsu Limited. Printing feeding apparatus for printers. 4,989,020, Cl. 346-157.000.

Namekata, Shinichi: *See*—
Suzuki, Koji; Oyama, Hajime; Namekata, Shinichi; Sawai, Yuji; and Yoo, Hideo, 4,989,043, Cl. 355-246.000.

Nanji, Amin A., to New England Deaconess Hospital Corporation. Method of drug detection. 4,988,628, Cl. 436-173.000.

Nann, Eberhard: *See*—
Beck, Fritz; Krohn, Holger; Wagner, Rainer; and Nann, Eberhard, 4,988,418, Cl. 204-153.100.

Nanyoshi, Yasutoshi; and Matsumura, Toshio, to Nissan Motor Company, Limited. Combustioning condition monitoring system for internal combustion engine. 4,987,770, Cl. 73-115.000.

Nap, Kimbel A. Dip stick resistive liquid level detector with adjustable stop. 4,988,975, Cl. 340-450.300.
Narahara, Mitsumasa; Yamauchi, Kazumi; Yatsuda, Yuji; Yasunaga, Shinichi; Moriguchi, Fujio; and Kato, Nobuhisa, to Fuji Xerox Co., Ltd. Coincidence circuit. 4,989,224, Cl. 377-39.000.
Narang, Rajendra K. Fuel burning furnace. 4,987,881, Cl. 126-110.00R.
Narayanan, Krishna: *See*—
Liang, Marc D.; Narayanan, Krishna; and Kurtz, John L., 4,989,253, Cl. 381-110.000.
Nardoditskaya, Vera A.: *See*—
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.
Narhi, Larry; and Pitman, Thomas, to Digital Equipment Corp. Signal transmission and receiving system with looped transmission line. 4,988,890, Cl. 307-147.000.
Naruse, Hideaki: *See*—
Ohki, Nobutaka; Naruse, Hideaki; Nagaoka, Satoshi; and Hanaki, Kouichi, 4,988,613, Cl. 430-547.000.
Naruse, Yoshihiro; Kato, Hideharu; and Iwata, Yoshifumi, to Aisin Seiki Kabushiki Kaisha; and Kabushiki Kaisha Shinsangyokaihatsu. Data encripting transfer. 4,989,244, Cl. 380-20.000.
Natansohn, Samuel: *See*—
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Stensland, David A., 4,988,179, Cl. 350-637.000.
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Kamiya, Saburo, 4,989,031, Cl. 355-30.000.
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Uehara, Toshihiro; Minaguchi, Hotaka; and Oba, Yoshinobu, 4,988,999, Cl. 341-59.000.
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Osawa, Nobuyuki, 4,988,215, Cl. 384-44.000.
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Kubokoya, Ryoichi; Higuchi, Yasushi; and Kawamoto, Kazunori, 4,989,064, Cl. 357-67.000.
Sakai, Masahiko; Hayashi, Mithuyuki; and Taniguchi, Toshihisa, 4,988,055, Cl. 242-159.000.
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Sugitani, Yuji; Kanjo, Yoshihiro; and Nishimura, Takanori, 4,988,201, Cl. 356-376.000.

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Nishio, Takeyoshi; Yokoi, Toshio; Nomura, Takao; Ueno, Kouhei; Akagawa, Tomohiko; Sakai, Ikunori; and Takasaki, Yasufumi, to Toyota Jidosha Kabushiki Kaisha. Impact-resistant polypropylene resin compositions. 4,988,764, Cl. 525-66.000.

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Arai, Hiromichi; Kitagawa, Jun; and Nishioka, Yasuo, 4,988,661, Cl. 502-327.000.

Nissan Chemical Industries Ltd.: *See*—
Taguchi, Toshihiko; Asano, Shozo; Osawa, Ken'ichi; Nagai, Hiroo; and Ikeda, Hisao, 4,988,395, Cl. 148-24.000.
Watanabe, Yoshitane; Suzuki, Keitaro; Suzuki, Mutsuko; and Okumura, Eiji, 4,988,505, Cl. 424-76.300.

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Ishii, Shigeru, 4,989,147, Cl. 364-424.100.
Iwakiri, Yasunori; and Moriyama, Akinobu, 4,988,428, Cl. 204-406.000.
Nagaishi, Hatsuo, 4,987,890, Cl. 123-492.000.
Nanyoshi, Yasutoshi; and Matsumura, Toshio, 4,987,770, Cl. 73-115.000.
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Orimoto, Hiroyuki; Aoki, Daiichi; and Miyazawa, Yoshiki, 4,988,472, Cl. 264-273.000.

Nissei Kabushiki Kaisha: *See*—
Nakaya, Tsunemoto; Karasawa, Taizo; Kihara, Nobuyuki; Wada, Yukihiro; and Kiyota, Masao, 4,988,529, Cl. 426-569.000.

Nissin Kogyo Kabushiki Kaisha: *See*—
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Nittan Company Ltd.: *See*—
Kimura, Tetsuo, 4,988,988, Cl. 340-825.060.

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Hara, Yojiro; Ishikawa, Shinzo; Shono, Hiroaki; and Matsumoto, Taiji, 4,988,492, Cl. 423-447.400.

Nitto Kohki Co., Ltd.: *See*—
Fukuda, Kenji, 4,988,245, Cl. 409-178.000.
Saito, Noboru; Kubo, Haruo; Kotake, Naoyuki; and Nagumo, Makoto, 4,988,129, Cl. 285-328.000.

NKK Corporation: *See*—
Koshihara, Toshio; Ishihara, Koji; Hirashima, Toru; Ishida, Shunichiro; Okamoto, Haruhito; and Matoba, Yuji, 4,988,210, Cl. 374-5.000.
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Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, to Mitsui Kensetsu Kabushiki Kaisha. Damping device in a structure and damping construction and damping method using those devices. 4,987,710, Cl. 52-167.0DF.

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Gill, David C., 4,987,725, Cl. 53-453.000.

Nomura, Hiroshi: *See*—
Ishii, Haruo; Kohmoto, Shinsuke; and Nomura, Hiroshi, 4,989,027, Cl. 354-253.000.

Nomura, Masami, to Mitsubishi Denki Kabushiki Kaisha. Control apparatus for A.C. elevator. 4,987,977, Cl. 187-112.000.

Nomura, Takao: *See*—
Nishio, Takeyoshi; Yokoi, Toshio; Nomura, Takao; Ueno, Kouhei; Akagawa, Tomohiko; Sakai, Ikunori; and Takasaki, Yasufumi, 4,988,764, Cl. 525-66.000.

Noninvasive Medical Incorporated: *See*—
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Nonomura, Yutaka: *See*—
Tsuchiya, Michio; Terazawa, Masaaki; and Nonomura, Yutaka, 4,989,018, Cl. 346-76.0PH.

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Dahlin, Ingemar; and Lagerqvist, Roger, 4,988,257, Cl. 414-420.000.

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Hall, Robert C., 4,987,854, Cl. 118-679.000.
Price, Richard P., 4,988,015, Cl. 222-1.000.

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Ejdenwik, Eugen E., 4,987,805, Cl. 81-77.000.

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Obata, Koichi; and Noriuchi, Yoshihiko, 4,988,524, Cl. 426-281.000.

Norman, Don T.; and Marney, Gary L., to Witco Corporation. Process for producing improved carbon blacks. 4,988,493, Cl. 423-450.000.

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Colak, Sel; and Rumennik, Valdimir, 4,989,058, Cl. 357-23.800.
Wegener, Armin F., 4,989,127, Cl. 363-16.000.

North Carolina State University: *See*—
Michaels, Alan S.; Peretti, Steven W.; and Tompkins, Christopher J., 4,988,443, Cl. 210-611.000.

Northern Telecom Limited: *See*—
Kwa, Peter T. H., 4,989,214, Cl. 372-50.000.

Norwood, David A.: *See*—
Manns, William G.; Wood, Anthony B.; Norwood, David A.; and Bambenek, Theodore R., 4,989,255, Cl. 382-8.000.

Novophalt Overseas S.A.: *See*—
Strommer, Erich, 4,988,747, Cl. 524-59.000.

Nowak, Florian I. Mount assembly for mechanical parts. 4,988,072, Cl. 248-674.000.

Nowicke, John H., to Eaton Corporation. In-tire filter assembly for central tire inflation system. 4,987,937, Cl. 152-400.000.

Nozone Dispenser Systems, Inc.: *See*—
Loychuk, Terrence, 4,988,018, Cl. 222-183.000.

nuArc Company, Inc.: *See*—
Leonhart, Charles J., 4,989,035, Cl. 355-93.000.

Nuimura, Yoshimi, to Kabushiki Kaisha Toshiba. Navigation apparatus and matching method for navigation. 4,989,151, Cl. 364-449.000.

Nunn, Charles C.; and Worley, William J., to Lever Brothers Company, Division of Conopco, Inc. Stabilization of particles containing quaternary ammonium bleach precursors. 4,988,451, Cl. 252-95.000.

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N.V. Nederlandsche Apparatenfabriek Nedap: *See*—
Hoeksma, Gerben S., 4,988,920, Cl. 315-101.000.

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Loce, Robert P.; Lama, William L.; and Nylen, Per S., 4,989,019, Cl. 346-108.000.

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Kistner, Anthony S.; Staats, Wayne M.; and Staats, Norman O., 4,987,763, Cl. 72-353.400.

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Uehara, Toshihiro; Minaguchi, Hotaka; and Oba, Yoshinobu, 4,988,999, Cl. 341-59.000.

Obara, Kenjiro; Nakamura, Kazuyuki; Murakami, Yoshio; Naganuma, Masamitsu; Kitamura, Kazunori; and Uchida, Takao, to Japan Atomic Energy Research Institute; and Kabushiki Kaisha Toshiba. Metal seal flange assembly. 4,988,130, Cl. 285-328.000.

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O'Brien, John T., to Storage Technology Corporation. Data compression system for successively applying at least two data compression methods to an input data stream. 4,988,998, Cl. 341-55.000.

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Kasler, Richard E.; and O'Bryan, Danny J., 4,988,233, Cl. 404-108.000.
O'Bryan, Nelson B., Jr.: *See*—
Davies, Paul; O'Bryan, Nelson B., Jr.; and Philip, James B., Jr., 4,988,615, Cl. 430-576.000.
Ochiai, Toshihiko; and Ando, Yujiro, to Canon Kabushiki Kaisha. Cleaning device for conductive magnetic toner and image recording apparatus using same. 4,989,021, Cl. 346-160.100.
Oda, Goro; Nagata, Niro; Nakatomi, Yoshitsugu; and Sawafuji, Takashi, to Kabushiki Kaisha Toshiba. Thermal print head. 4,989,017, Cl. 346-76.0PH.
Odell, Edwin C.; and Scott, Martin G., to Thorn EMI plc. Discharge arc lamp. 4,988,916, Cl. 313-623.000.
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O'Donnell, Matthew; and Flax, Stephen W., to General Electric Company. Adaptive coherent energy beam formation using iterative phase conjugation. 4,989,143, Cl. 364-413.250.
Oediger, Hermann: *See*—
Boshagen, Horst; Rosentreter, Ulrich; Lieb, Folker; Oediger, Hermann; Seuter, Friedel; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 4,988,820, Cl. 548-439.000.
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Heppke, Gerd; and Oestreicher, Feodor, 4,988,458, Cl. 252-299.630.
Oetiker, Hans, to Hans Oetiker AG Maschinen- und Apparatefabrik. Earless clamp. 4,987,651, Cl. 24-20.00R.
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Ogata, Masaru; Matsumoto, Hiroshi; Shimizu, Sumio; and Kida, Shiro, to Shionogi & Co., Ltd. Quinolone-carboxylic acids as antibacterial agents. 4,988,709, Cl. 514-314.000.
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Fujisaka, Takahiko; and Oh-hashi, Yoshimasa, 4,989,008, Cl. 342-25.000.
O'Hara, Thomas J.; Ayers, Alan D.; and Malay, Manuel R., to Eveready Battery Company, Inc. Liquid cathode electrochemical cells having insured anode to tab contact. 4,988,585, Cl. 429-66.000.
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Mochizuki, Hirohiko; Ohira, Tsuyoshi; Kodama, Yukinori; Kobayashi, Meiko; and Furuyama, Takaaki, 4,989,182, Cl. 365-210.000.
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Scherowsky, Gunter; Gay, Jurgen; Dubal, Hans-Rolf; Escher, Claus; Hemmerling, Wolfgang; Muller, Ingrid; Ohlendorf, Dieter; and Wingen, Rainer, 4,988,459, Cl. 252-299.610.
Ohnishi, Yoshiro: *See*—
Wakiyama, Yoshihiro; and Ohnishi, Yoshiro, 4,989,005, Cl. 341-166.000.
Ohsaki, Kozo; Okada, Mitsuo; and Shima Kazumi, to Toyo Engineering Corporation. Fuel cell power generating system. 4,988,580, Cl. 429-19.000.
Ohta, Hisao: *See*—
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.
Ohta, Masakatsu, to Canon Kabushiki Kaisha. Illumination device. 4,988,188, Cl. 353-122.000.
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Ohtsuki, Masayuki: *See*—
Nagatsuka, Yoshitaka; Ohtsuki, Masayuki; Saito, Masaki; Yoshida, Koji; and Kawabe, Kazuyasu, 4,988,872, Cl. 250-310.000.
Ohyama, Kazunobu; and Yamai, Hiroyuki, to Daikin Industries, Ltd. Pulse width modulation control unit of inverter. 4,989,128, Cl. 363-41.000.
Oikawa, Haruki: *See*—
Hasegawa, Jun; Oikawa, Haruki; Kobayashi, Osamu; Kataoka, Yasuo; and Sekiya, Masayoshi, 4,988,568, Cl. 428-402.000.
Oji Paper Co., Ltd.: *See*—
Nemoto, Hiroyuki; Kamiya, Masahiro; and Shigetani, Tsunehisa, 4,988,559, Cl. 428-219.000.
Oka, Ryu-ichi; and Matsumura, Hiroshi, to Sanyo Electric Co., Ltd.; and Agency of Industrial Science and Technology. Method of feature determination and extraction and recognition of voice and apparatus therefore. 4,989,249, Cl. 381-43.000.
Okabe, Minoru: *See*—
Kanamori, Iwao; Kikuchi, Akira; and Okabe, Minoru, 4,988,172, Cl. 350-413.000.
Okada, Hiroyuki: *See*—
Inoue, Manabu; and Okada, Hiroyuki, 4,989,029, Cl. 354-418.000.
Okada, Makoto; and Yokoyama, Naoki, to Fujitsu Limited. Quantum effect semiconductor device. 4,989,052, Cl. 357-22.000.
Okada, Mitsuo: *See*—
Ohsaki, Kozo; Okada, Mitsuo; and Shima Kazumi, 4,988,580, Cl. 429-19.000.
Okamoto, Haruhito: *See*—
Koshihara, Toshio; Ishihara, Koji; Hirashima, Toru; Ishida, Shunichiro; Okamoto, Haruhito; and Matoba, Yuji, 4,988,210, Cl. 374-5.000.
Okamoto, Tadashi: *See*—
Ono, Shoichi; Yokoo, Kuniyoshi; and Okamoto, Tadashi, 4,988,956, Cl. 331-86.000.
Okamura, Masatoshi: *See*—
Nakayama, Masatoshi; Ueda, Kunihiro; and Okamura, Masatoshi, 4,988,573, Cl. 428-421.000.
Okano, Keiji: *See*—
Nishimura, Katsuhiko; Yamazaki, Michihito; Okano, Keiji; Katoh, Motoi; Suwa, Kouichi; Sato, Yasushi; and Nakahata, Kimio, 4,989,044, Cl. 355-251.000.
Okao, Toshikatsu: *See*—
Sakaguchi, Haruo; Iwatani, Shiromitsu; and Okao, Toshikatsu, 4,987,949, Cl. 164-450.000.
Okazaki, Gohki: *See*—
Funabashi, Motohisa; Sekozawa, Teruji; Shioya, Makoto; Onari, Mikihiko; Takahashi, Shinsuke; and Okazaki, Gohki, 4,987,888, Cl. 123-488.000.
Okazaki, Kunihati: *See*—
Ikarashi, Masayoshi; and Okazaki, Kunihati, 4,987,811, Cl. 83-372.000.
Okazaki, Susumu; Endo, Hiroshi; and Hino, Kuniaki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Complex phosphate adsorbent of MgO–Ti-O_2. 4,988,569, Cl. 428-403.000.
Okesaku, Masahiro; Miyahara, Michito; Ataka, Ryosuke; and Nakagawa, Torru, to Nippon Tungsten Co.; Ltd. Tsudakoma Corp.; and Okesaku, Masahiro. Auxiliary sub-nozzle for fluid jet loom. 4,987,930, Cl. 139-435.500.
Oki Electric Industry Co., Ltd.: *See*—
Kuroe, Shigeru; Takeda, Takayuki; and Sato, Masayasu, 4,989,190, Cl. 369-32.000.
Okuda, Masakiyo: *See*—
Matsuo, Toshihisa; Ougita, Kazuyuki; Kajiwara, Junichi; and Okuda, Masakiyo, 4,989,040, Cl. 355-218.000.
Okumura, Eiji: *See*—
Watanabe, Yoshitane; Suzuki, Keitaro; Suzuki, Mutsuko; and Okumura, Eiji, 4,988,505, Cl. 424-76.300.
Okura Techno-Research Kabushiki Kaisha: *See*—
Atsushi, Ogura, 4,988,648, Cl. 501-126.000.
Olbrich, Bernd: *See*—
Schmidt, Thomas; Olbrich, Bernd; Nohl, Gerd; and Rohr, Gustav, 4,988,865, Cl. 250-231.160.
Olm, Orville: *See*—
Haffey, David J.; Haffey, Susan C.; and Olm, Orville, 4,987,662, Cl. 24-633.000.
Olney, John W., to Washington University. Aryl-cycloalkyl-alkanolamines for treatment of cholinergic neurotoxins. 4,988,710, Cl. 514-318.000.
Olshansky, Robert; and Gross, Richard W., to GTE Laboratories Incorporated. Coherent subcarrier multiplexed optical communication system. 4,989,200, Cl. 370-3.000.
Olson, Alfred P.: *See*—
Salamone, Ann B.; Salamone, Joseph C.; and Olson, Alfred P., 4,987,893, Cl. 128-156.000.
Olszewski, Christopher: *See*—
Minasy, Arthur J.; and Olszewski, Christopher, 4,987,754, Cl. 70-57.100.
Olympus Optical Co., Ltd.: *See*—
Eino, Teruo, 4,989,083, Cl. 358-107.000.
Ichikawa, Hajime, 4,988,164, Cl. 350-165.000.
Kanamori, Iwao; Kikuchi, Akira; and Okabe, Minoru, 4,988,172, Cl. 350-413.000.
Nishioka, Kimihiko; Ogiu, Hisao; and Nagasaki, Tatsuo, 4,987,884, Cl. 128-6.000.
Suzuki, Tatsuya; and Matsutani, Shunji, 4,989,026, Cl. 354-150.000.
Yokota, Akira, 4,988,171, Cl. 350-404.000.
Omron Tateisi Electronics Co.: *See*—
Mita, Katsuya, 4,988,854, Cl. 235-476.000.
Shonaka, Hisashi, 4,989,178, Cl. 364-900.000.
Onari, Hisashi: *See*—
Akasaka, Shingo; Sugino, Kazuhiro; Saeki, Junichi; Nishi, Kunihiko; and Onari, Hisashi, 4,989,166, Cl. 364-578.000.
Onari, Mikihiko: *See*—
Funabashi, Motohisa; Sekozawa, Teruji; Shioya, Makoto; Onari, Mikihiko; Takahashi, Shinsuke; and Okazaki, Gohki, 4,987,888, Cl. 123-488.000.

Onishi, Janet C., to Merck & Co., Inc. Fungicidal compositions and method. 4,988,697, Cl. 514-252.000.

Onishi, Yasunobu: *See—*
Ushirogouchi, Toru; Hayase, Shuji; Onishi, Yasunobu; and Horiguchi, Rumiko, 4,988,601, Cl. 430-192.000.

Ono, Shoichi; Yokoo, Kuniyoshi; and Okamoto, Tadashi, to Kabushiki Kaisha Toshiba. Auto-resonant peniotron having amplifying waveguide section. 4,988,956, Cl. 331-86.000.

Onoue, Keiji: *See—*
Kawasaki, Yoshio; Kishita, Yoshiaki; Horibe, Tatsutake; Fujii, Masakatsu; and Onoue, Keiji, 4,987,645, Cl. 19-25.000.

Oosawa, Tetsuo: *See—*
Masuda, Noboru; Oosawa, Tetsuo; and Tomaki, Kenji, 4,988,850, Cl. 235-449.000.

Ootsuka, Hiroshi: *See—*
Hamada, Masataka; Ishida, Tokuji; and Ootsuka, Hiroshi, 4,988,856, Cl. 250-201.800.

Oppawsky, Steffen, to Heraeus Kulzer GmbH. Fingernail photopolymerization apparatus. 4,988,883, Cl. 250-492.100.

Optica Nova Onab AB: *See—*
Berglund, Stig, 4,988,176, Cl. 350-470.000.

Orain, Michel A., to Glaenzer-Spicer. Device for transferring load through a rolling element mounted with a plain bearing, methods for producing the device, and a transmission joint provided with the latter. 4,988,327, Cl. 464-111.000.

Orichefsky, Lucien: *See—*
Boutin, Francois, 4,987,919, Cl. 137-204.000.

Orimoto, Hiroyuki; Aoki, Daiichi; and Miyazawa, Yoshiki, to Nissei ASB Machine Co., Ltd. Method of inserting a piece into a mold for molding a mouth of a preform. 4,988,472, Cl. 264-273.000.

Orlek, Barry S.: *See—*
Hadley, Michael S.; Orlek, Barry S.; Wyman, Paul A.; and Wadsworth, Harry J., 4,988,706, Cl. 514-299.000.

Oros, Gyula: *See—*
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Orthofix S.r.l.: *See—*
Pennig, Dietmar, 4,988,349, Cl. 606-58.000.

Ortiz, Marcos G.; and Stix, Marsha S., to AT&T Bell Laboratories. Near infrared polyethylene inspection system and method. 4,988,875, Cl. 250-330.000.

Orvik, Jon A.: *See—*
Kim, Kay K.; Krauss, Richard C.; and Orvik, Jon A., 4,988,812, Cl. 544-263.000.

Osaka, Noriyuki: *See—*
Takeuchi, Fumikatsu; Takeuchi, Tsutomu; Osaka, Noriyuki; Takizawa, Yoichi; and Kawase, Susumu, 4,988,771, Cl. 525-276.000.

Osaka Yuki Kagaku Kogyo Kabushiki Kaisha: *See—*
Kambayashi, Taiji; Mekata, Hideyuki; Kataoka, Hiroyuki; and Kato, Chuzo, 4,988,390, Cl. 106-774.000.

Osakabe, Yoshio: *See—*
Miyagawa, Masayuki; Itabashi, Takao; Yamada, Hisafumi; and Osakabe, Yoshio, 4,989,081, Cl. 358-93.000.

Osaki Electric Co., Ltd.: *See—*
Takagi, Masatoshi, 4,988,972, Cl. 340-310.00A.

Osawa, Ken'ichi: *See—*
Taguchi, Toshihiko; Asano, Shozo; Osawa, Ken'ichi; Nagai, Hiroo; and Ikeda, Hisao, 4,988,395, Cl. 148-24.000.

Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Linear guide apparatus using a combination of balls and rollers. 4,988,215, Cl. 384-44.000.

Osdoby, Philip A.: *See—*
Eppley, Barry L.; Krukowski, Marilyn D.; and Osdoby, Philip A., 4,988,358, Cl. 623-16.000.

Oslapas, Algis; and Rumpel, Manfred, to Ford Motor Company. Steering gear for the roadwheels of a vehicle. 4,987,963, Cl. 180-79.100.

Ostler, Kevin, to Ion Laser Technology. Laser resonator. 4,989,217, Cl. 372-107.000.

Ostma Maschinebau GmbH: *See—*
Odenthal, Heinz F., 4,988,263, Cl. 414-795.800.

Ota, David M.: *See—*
Ajani, Jaffer; Grossie, Bruce, Jr.; Nishioka, Kenji; and Ota, David M., 4,988,724, Cl. 514-399.000.

Ott, Karl-Heinz: *See—*
Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, 4,988,748, Cl. 524-141.000.

Otteman, John H. High flow rate miniature valve. 4,988,078, Cl. 251-367.000.

Ottino, Franco G., to Roltra Morse S.p.A. Load-increasable electrically operated lock, particularly for automotive application. 4,988,135, Cl. 292-201.000.

Oughton, George W., Jr., to Self-Powered Lighting, Inc. Power source for emergency lighting systems. 4,988,889, Cl. 307-66.000.

Ougita, Kazuyuki: *See—*
Matsuo, Toshihisa; Ougita, Kazuyuki; Kajiwara, Junichi; and Okuda, Masakiyo, 4,989,040, Cl. 355-218.000.

Ounanian, Hovig O.; Cohen, Kenneth A.; DiSomma, Joseph; and Gedeon, Harvey, to Revlon, Inc. Mascara composition. 4,988,502, Cl. 424-63.000.

Overbeek, Gerardus C.; and Heuts, Martinus P. J., to ICI Resins b.v. Aqueous coating compositions. 4,988,762, Cl. 524-839.000.

Overfield, Robert E.: *See—*
Haberman, Joel I.; Overfield, Robert E.; and Robbins, Winston K., 4,988,446, Cl. 210-656.000.

Overton, Jerry D., to W. R. Grace & Co.-Conn. Binder for pelleted animal feeds. 4,988,520, Cl. 426-74.000.

Owada, Mitsuru; Tajima, Mizuho; and Nagashima, Yoshitake, to Canon Kabushiki Kaisha. Video projection apparatus. 4,989,076, Cl. 358-61.000.

Owen, Hartley: *See—*
Harandi, Mohsen N.; and Owen, Hartley, 4,988,366, Cl. 44-449.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,988,653, Cl. 502-67.000.

Owen, John S. Safes. 4,987,836, Cl. 109-52.000.

Oxley, Donald W.; Manuel, Glenn E.; Knight, William M., Jr.; and Loafman, Jeri J., to Texas Instruments Incorporated. Computer memory system. 4,989,137, Cl. 364-200.000.

Oxytechnik Gesellschaft: *See—*
Bauer, Helmut; and Wilkens, Gunter, 4,988,845, Cl. 219-121.630.

Oyama, Hajime: *See—*
Suzuki, Koji; Oyama, Hajime; Namekata, Shinichi; Sawai, Yuji; and Yoo, Hideo, 4,989,043, Cl. 355-246.000.

Ozeki, Mamoru; and Tsuda, Akihico, to Toshiba Kikai Kabushiki Kaisha. Gas venting device for molding operations. 4,987,947, Cl. 164-305.000.

Ozu, Hiroyuki: *See—*
Kamuro, Setsufumi; Shibuya, Yoshiaki; and Ozu, Hiroyuki, 4,988,901, Cl. 307-518.000.

Paalman, H. Hunter: *See—*
Matthews, W. Thomas; and Paalman, H. Hunter, 4,988,737, Cl. 521-26.000.

Paek, Eung-Gi, to Bell Communications Research, Inc. Holographic memory read by a laser array. 4,988,153, Cl. 350-3.800.

Page, Graham A.: *See—*
Butters, Alan; and Page, Graham A., 4,988,572, Cl. 428-413.000.

Pahade, Ravindra F.: *See—*
Handley, James R.; and Pahade, Ravindra F., 4,987,744, Cl. 62-24.000.

Pai, Damodar M.; Yanus, John F.; and DeFeo, Paul J., to Xerox Corporation. Charge transport layer containing different aromatic diamine active charge transport compounds. 4,988,595, Cl. 430-59.000.

Palco Telecom Inc.: *See—*
Wollet, William M.; and Grantland, Gary, 4,988,860, Cl. 250-223.00R.

Palm, Charles S.: *See—*
Slayton, Danny L.; Tompkins, E. Neal; Lak, Khosrow; and Palm, Charles S., 4,989,045, Cl. 355-260.000.

Palmer, Charles F., Jr.: *See—*
Wingrave, James A.; Carter, Thomas S.; and Palmer, Charles F., Jr., 4,988,450, Cl. 252-8.514.

Palmer, George T.: *See—*
Den Hartog, Herman C.; Palmer, George T.; and Yeramyan, Ara G., 4,988,759, Cl. 524-517.000.

Palum, Russell J.; and Greivenkamp, John E., to Eastman Kodak Company. Moire distance measurement method and apparatus. 4,988,886, Cl. 250-561.000.

Papa, James M.: *See—*
Markis, William R.; Papa, James M.; and Murray, Michael T., 4,988,932, Cl. 318-560.000.

Papania, James R., to General Motors Corporation. Method of assembling an overrunning roller clutch with improved spring retention. 4,987,670, Cl. 29-451.000.

Pape, Georg: *See—*
Hamprecht, Rainer; Kressner, Michael; and Pape, Georg, 4,988,752, Cl. 524-190.000.

Papp, Gyula: *See—*
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Para-Tech Industries, Inc.: *See—*
Reisner, Robert J., 4,988,102, Cl. 273-81.00A.

Paris, Jean: *See—*
Houle, Jean-Francois; and Paris, Jean, 4,988,543, Cl. 427-372.200.

Parker, Donald I. Process and apparatus for producing dry black liquor solids. 4,988,407, Cl. 162-30.110.

Parkin, Stuart S. P.: *See—*
Engler, Edward M.; Lee, Victor Y.; Nazzal, Adel I.; and Parkin, Stuart S. P., 4,988,668, Cl. 505-1.000.

Parkinson, Susan H.: *See—*
Vidwans, Mohan P.; Parkinson, Susan H.; Scott, Glenn; and Fecteau, Anthony J., 4,988,134, Cl. 292-198.000.

Parks, Paul L., to PCC Airfoils, Inc. Method of making a turbine engine component. 4,987,944, Cl. 164-10.000.

Pasternak, Israel S.: *See—*
Manalastas, Pacifico V.; Thaler, Warren A.; Drake, Evelyn N.; and Pasternak, Israel S., 4,988,377, Cl. 71-28.000.

Pastryk, Jim J.: *See—*
Cur, Nihat O.; Pastryk, Jim J.; Hardaway, Anthony H.; and Euler, John W., 4,987,627, Cl. 8-158.000.

Patel, Kundan M.: *See—*
Paul, Charles W.; Patel, Kundan M.; and Arnold, Stephen C., 4,988,785, Cl. 526-259.000.

Patel, Mansukh M.; Witkewitz, David; and Kures, Vasek J., to Wm. Wrigley Jr. Company. Chewing gum with liquid flavor added to the rolling compound and method. 4,988,518, Cl. 426-5.000.

Patel, Parsotam T.: *See—*
Masleid, Robert P.; and Patel, Parsotam T., 4,988,636, Cl. 437-51.000.

Patsch, Manfred: *See—*
Loeffler, Hermann; and Patsch, Manfred, 4,988,802, Cl. 534-634.000.

Patterson, Richard S.: *See—*
Brenner, Richard J.; Patterson, Richard S.; Pierce, Roger R.; and Hult, Marvin H., 4,988,510, Cl. 424-84.000.

Paul, Bernt-Joachim, to Siemens Aktiengesellschaft. Method and apparatus for measuring the concentration of optically active substances. 4,988,199, Cl. 356-368.000.

Paul, Charles W.; Patel, Kundan M.; and Arnold, Stephen C., to Allied-Signal. Bismaleimide resin based on indane bisphenol. 4,988,785, Cl. 526-259.000.

Paul Wurth S.A.: *See—*
Mailliet, Pierre; Lonardi, Emile; Wahl, Georges; and Hoelpes, Gustave, 4,987,838, Cl. 110-182.500.

Paulos, Leon E.; Rosenberg, Thomas D.; and Ross, Randall D., to Concept, Inc. Washer for use with cancellous screw for attaching soft tissue to bone. 4,988,351, Cl. 606-72.000.

Paxton, K. Bradley, to Eastman Kodak Company. Still video camera for recording stereo images on a video disk. 4,989,078, Cl. 358-88.000.

Payne, Roger D.; and Capaldi-Tallon, Alan, to Apollo Fire Detectors Limited. Address setting means for fire detectors. 4,988,977, Cl. 340-524.000.

Paytas, Anthony R. Solar powered mower. 4,987,729, Cl. 56-11.900.

PCC Airfoils, Inc.: *See—*
Parks, Paul L., 4,987,944, Cl. 164-10.000.

Peacock, David J. H.; and Dorsett, Michael D., to Peacock, David John Howard. Ultrasonic leak detection. 4,987,769, Cl. 73-49.700.

Peacock, David John Howard: *See—*
Peacock, David J. H.; and Dorsett, Michael D., 4,987,769, Cl. 73-49.700.

Peck, Glenn L., Jr.; Foster, James F.; and Pol, Kenneth J., to Roberts Sinto Corporation. Accumulating conveyor with self-propelled pallets. 4,987,834, Cl. 104-300.000.

Pecoraro, Theresa A., to Chevron Research Company. Silica/alumina cogel catalysts. 4,988,659, Cl. 502-235.000.

Pederson, Glen E.: *See—*
Gillig, Steven F.; and Pederson, Glen E., 4,989,230, Cl. 379-59.000.

Pedotti, Antonio; and Ferrigno, Giancarlo, to Fondazione Projuventute Don Carlo Gnocchi. Optical correlator for incoherent light images. 4,989,259, Cl. 382-42.000.

Pees, James M., to General Motors Corporation. Spliced air sleeve assembly for air spring damper. 4,988,082, Cl. 267-64.240.

Pegasus Sewing Machine Co., Ltd.: *See—*
Kasuda, Takashi, 4,987,843, Cl. 112-320.000.

Peilloud, Fernand, to Torrington Company, The. Roller bearing assembly with sensor device. 4,988,219, Cl. 384-448.000.

Peirson, Paul L.: *See—*
Scheuneman, James H.; Peirson, Paul L.; and Mayer, Michael E., 4,989,210, Cl. 371-40.100.

Pele, Daniele; and Choquet, Bruno, to Telediffusion de France; and Telediffusion De France. Multi-predictive method to estimate the motion of the points of an electronic picture. 4,989,087, Cl. 358-136.000.

Peng, Shie-Ming: *See—*
Wan, Shyue-Yun; Peng, Shie-Ming; and Wu, Der-Chwan, 4,989,246, Cl. 381-40.000.

Pennig, Dietmar, to Orthofix S.r.l. Device for osteosynthesis. 4,988,349, Cl. 606-58.000.

Pereman, Gordon F.; and Kellar, John D., to PPG Industries, Inc. Laminate prepress roll assembly. 4,988,398, Cl. 156-064.000.

Peretti, Steven W.: *See—*
Michaels, Alan S.; Peretti, Steven W.; and Tompkins, Christopher J., 4,988,443, Cl. 210-611.000.

Perichon, Jacques: *See—*
Troupel, Michel; Sibille, Soline; Perichon, Jacques; D'Incan, Esther; and Saboureau, Christhophe, 4,988,416, Cl. 204-59.00R.

Perkins, Raymond R.: *See—*
Woodbury, Richard C.; Perkins, Raymond R.; Thorne, James M.; and Knight, Larry V., 4,989,226, Cl. 378-145.000.

Perkitny, Jerzy, to Mag-Nif, Inc. Coin Bank. 4,987,990, Cl. 194-242.000.

Perry, Ralph; and Weaver, Edgar N., Jr. Method and course for playing a golf-like game. 4,988,105, Cl. 273-176.00A.

Perusich, Stephen A.; and Keating, James T., to Du Pont de Nemours, E. I., and Company. Coated cation exchange yarn and process. 4,988,364, Cl. 8-115.520.

Perzborn, Elisabeth: *See—*
Boshagen, Horst; Rosentreter, Ulrich; Lieb, Folker; Oediger, Hermann; Seuter, Friedel; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 4,988,820, Cl. 548-439.000.

Pesheck, Peter S.; Atwell, William A.; Krawiecki, Madonna M.; and Anderson, George R., to Pillsbury Company, The. Microwave food products and method of their manufacture. 4,988,841, Cl. 219-10.55M.

Peters, Alan R.: *See—*
Kozyrski, Vincent T.; and Peters, Alan R., 4,987,814, Cl. 83-884.000.

Petersen, Hans H.: *See—*
Buckenham, Nicholas H.; Tansley, Robert W.; and Petersen, Hans H., 4,987,989, Cl. 194-237.000.

Peterson, Scott W.; and Schroeder, Marvin J., to Minnesota Mining and Manufacturing Company. Abrasive article coated with a lithium salt of a fatty acid. 4,988,554, Cl. 428-142.000.

Petho, Lajos; Håkansson, Ivan; and Månsson, Lennart, to KabiVitrum AB. Bottle filling and sealing apparatus. 4,987,726, Cl. 53-510.000.

Petit, Gaston; and Monteiro, Daniel, to Auximat-Levage. Fruit-processing oven, particularly for converting raw plums into prunes by desiccation. 4,987,688, Cl. 34-69.000.

Petrie, Glenn E.: *See—*
Highsmith, Ronald E.; Good, Frederick J., Jr.; Lupton, Francis S.; Kehrer, Kenneth P.; and Petrie, Glenn E., 4,988,442, Cl. 210-609.000.

Pettersson, Lars T.; and Wiman, Jorgen V., to Sandvik AB. Cutting insert for chip forming machining. 4,988,242, Cl. 407-114.000.

Pettit, Delmer E., to Industrial Fabricators Machine, Inc. Bushing. 4,988,231, Cl. 403-370.000.

Pettit, Paul H., Jr., to PPG Industries, Inc. Thermosetting powder coating composition containing a mixture of low Tg and high Tg polymers with acid functional groups. 4,988,767, Cl. 525-194.000.

Petzinna, Dieter: *See—*
Angerbauer, Rolf; Hubsch, Walter; Fey, Peter; Bischoff, Hilmar; Petzinna, Dieter; Schmidt, Delf; and Thomas, Gunter, 4,988,711, Cl. 514-326.000.

Pfefferkorn, Jason L., to Pfefferkorn, Jason L.; Swaim, Ronnie D.; and Evans, James H. Rear fastening disposable diaper. 4,988,346, Cl. 604-389.000.

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Pitman, Thomas: *See—*
Narhi, Larry; and Pitman, Thomas, 4,988,890, Cl. 307-147.000.
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Haw, Thomas E.; Williams, Jeannie E.; and Wober, Munib A., 4,989,213, Cl. 372-45.000.
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Powers, Richard G.; London, Eugene J.; Alley, Lewis F.; Anderson, James E.; and Zeets, Joseph S., to Marlen Research Corporation. Slide plate patty forming apparatus. 4,987,643, Cl. 425-139.000.
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Bailey, Denis M.; and Powles, Ronald G., 4,988,725, Cl. 514-406.000.
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PPG Industries, Inc.: *See—*
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Preiser, Herbert W. Retractable barbless fishing lure. 4,987,695, Cl. 43-42.410.
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Price, Richard P., to Nordson Corporation. Method for dispensing fluid materials. 4,988,015, Cl. 222-1.000.
Price, Sankey E.; Kussin, Richard F.; Fruhling, Robert J.; and Harris, Marva B., to Procter & Gamble Company, The. Ultrafast roasted coffee. 4,988,590, Cl. 426-595.000.
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Princeton University, Trustees of: *See—*
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Anderson, Edward K., III, 4,988,971, Cl. 338-32.00S.
Propp, Clarence E.; and Kerr, J. Russell. Electrical box hanger. 4,988,067, Cl. 248-343.000.
Prosthetic Consultants, Inc.: *See—*
Shamp, Daniel L., 4,988,360, Cl. 623-33.000.
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Purguette, Edmond J. P. Motion or force take-off device for motor vehicles. 4,987,962, Cl. 180-53.600.
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Suzuki, Koji; Oyama, Hajime; Namekata, Shinichi; Sawai, Yuji; and Yoo, Hideo, 4,989,043, Cl. 355-246.000.
Tsumura, Naoki, 4,989,232, Cl. 379-88.000.
Riebel, Hans-Jochem: *See*—
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel,

Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.
Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.

Riedl, Franz: *See*—
Gruner, Manfred; and Riedl, Franz, 4,989,116, Cl. 361-154.000.

Riegel, Stephen E.: *See*—
Mellender, Fredric H.; Straw, Andrew G.; and Riegel, Stephen E., 4,989,132, Cl. 364-200.000.

Rieter Machine Works, Ltd.: *See*—
Clement, Heinz, 4,987,648, Cl. 19-115.00R.
Meyer, Urs, 4,987,734, Cl. 57-100.000.

Riffle, Judy S.; and Sinai-Zingde, Gurudus D., to Virginia Tech Intellectual Properties, Inc. Polyalkylvinyl ether/polyalkyloxazoline copolymers, processes for making, and uses. 4,988,772, Cl. 525-328.900.

Rigby, Gordon J.: *See*—
Allen, Phillip G.; and Rigby, Gordon J., 4,987,630, Cl. 15-1.510.

Riker Laborstories, Inc.: *See*—
Andre , Jean-Denis; and Lagain, Daniel, 4,988,815, Cl. 546-159.000.

Riley, Kenneth L.: *See*—
Aldridge, Clyde L.; Bearden, Roby, Jr.; and Riley, Kenneth L., 4,988,434, Cl. 208-251.00H.

Riley, Michael F., to Union Carbide Corporation. Method for producing powder by gas atomization. 4,988,464, Cl. 264-12.000.

Roadway Express, Inc.: *See*—
Calhoun, George W., 4,988,125, Cl. 283-67.000.

Robbins, Winston K.: *See*—
Haberman, Joel I.; Overfield, Robert E.; and Robbins, Winston K., 4,988,446, Cl. 210-656.000.

Robert Bosch GmbH: *See*—
Geselle, Helmut; and Buhren, Harald, 4,987,872, Cl. 123-396.000.
Hofer, Gerald; Laufer, Helmut; and Staubel, Max, 4,987,875, Cl. 123-449.000.
Zirps, Wilhelm, 4,988,147, Cl. 303-116.000.

Roberts, David A.: *See*—
Bohling, David A.; Muhr, Gregory T.; and Roberts, David A., 4,988,640, Cl. 437-81.000.

Roberts, Mark J. Apparatus for transferring water from a container to a refrigerator ice maker. 4,987,746, Cl. 62-137.000.

Roberts Sinto Corporation: *See*—
Peck, Glenn L., Jr.; Foster, James F.; and Pol, Kenneth J., 4,987,834, Cl. 104-300.000.

Robinson, William H., Jr.: *See*—
Garrett, Charles W.; Robinson, William H., Jr.; and Sierk, Dennis A., 4,989,160, Cl. 364-509.000.

Robot Foto und Electronic GmbH U. Co. KG: *See*—
Loeven, Hans-Gerd, 4,988,994, Cl. 340-936.000.

Robyn, Pierre: *See*—
Mottet, Leon-Philippe; Robyn, Pierre; and Laroche, Pierre, 4,988,647, Cl. 501-99.000.

Rocchitelli, Onofrio. Doorlatch, in particular for washing machines. 4,988,132, Cl. 292-144.000.

Rochal Industries, Inc.: *See*—
Salamone, Ann B.; Salamone, Joseph C.; and Olson, Alfred P., 4,987,893, Cl. 128-156.000.

Roeder GmbH Sitzmoebelwerke: *See*—
Engel, Hartmut S., 4,988,145, Cl. 297-301.000.

Roesch, Edouard, to Dixi S.A. Machine-tool. 4,987,668, Cl. 29-568.000.

Roetzel, Hartmut: *See*—
Heathe, William R.; and Roetzel, Hartmut, 4,988,281, Cl. 425-559.000.

Rogers Corporation: *See*—
Hernandez, Jorge M., 4,989,117, Cl. 361-306.000.

Rohm Co., Ltd.: *See*—
Matuo, Kozo, 4,988,403, Cl. 156-643.000.

Rohr, Gustav: *See*—
Schmidt, Thomas; Olbrich, Bernd; Nohl, Gerd; and Rohr, Gustav, 4,988,865, Cl. 250-231.160.

Rohr Industries, Inc.: *See*—
Cadwell, Gilbert C., 4,988,037, Cl. 228-265.000.

Rohs, Ulrich; Heidingsfeld, Dietmar; and Meuter, Herbert. Swivel disk friction gearing. 4,987,789, Cl. 74-200.000.

Roll, Phillip E.: *See*—
Westerman, Everett A.; and Roll, Phillip E., 4,987,700, Cl. 51-34.00E.

Rolls-Royce plc: *See*—
Bettridge, David F.; Cunningham, Terence P.; and Forman, Brian W., 4,988,575, Cl. 428-469.000.
Cantwell, Hugh F., 4,987,737, Cl. 60-39.281.

Roltra Morse S.p.A.: *See*—
Ottino, Franco G., 4,988,135, Cl. 292-201.000.

Romand, Paul: *See*—
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, 4,987,642, Cl. 452-136.000.

Rooklyn, Jack, to Industrial Management Co. Method and apparatus for producing conductivity in materials. 4,988,419, Cl. 204-157.420.

Ropak Corporation: *See*—
Baiuley, David E.; and Bingisser, Josef E., 4,987,639, Cl. 16-126.000.

Rose, Andrew M.: *See*—
Warner, Nicholas M.; and Rose, Andrew M., 4,989,103, Cl. 360-67.000.

Rose, James W.: *See*—
Liu, Yung S.; Cole, Herbert S.; Guida, Renato; and Rose, James W., 4,988,412, Cl. 204-15.000.

Rosemount Inc.: *See*—
Warrior, Jogesh, 4,988,990, Cl. 340-25.500.

Rosen, David B. Abutment for orthodontic anchorage to a dental implant fixture. 4,988,292, Cl. 433-8.000.

Rosen, Harold A.; and Thompson, James D., to Hughes Aircraft Company. Dual mode phased array antenna system. 4,989,011, Cl. 342-373.000.

Rosen, Terry J.: *See*—
Norbeck, Daniel W.; Rosen, Terry J.; and Sham, Hing L., 4,988,703, Cl. 514-262.000.

Rosenberg, Thomas D.: *See*—
Paulos, Leon E.; Rosenberg, Thomas D.; and Ross, Randall D., 4,988,351, Cl. 606-72.000.

Rosentreter, Ulrich: *See*—
Boshagen, Horst; Rosentreter, Ulrich; Lieb, Folker; Oediger, Hermann; Seuter, Friedel; Perzborn, Elisabeth; and Fiedler, Volker-Bernd, 4,988,820, Cl. 548-439.000.

Ross, Randall D.: *See*—
Paulos, Leon E.; Rosenberg, Thomas D.; and Ross, Randall D., 4,988,351, Cl. 606-72.000.

Rossall, Brian: *See*—
Evans, Kenneth A.; Biley, Paul I.; and Rossall, Brian, 4,988,498, Cl. 424-52.000.

Roth, John R., to United States of America, Air Force. Microwave absorption system. 4,989,006, Cl. 342-1.000.

Rothrock, Larry R.: *See*—
Collins, Paul R.; and Rothrock, Larry R., 4,988,293, Cl. 433-8.000.

Rouchy, Didier: *See*—
Tirelli, Marco; Rouchy, Didier; and Rapeau, Jean-Claude, 4,989,227, Cl. 378-177.000.

Rourke, William J.: *See*—
Lai, Wen-Chao; Rourke, William J.; and Natansohn, Samuel, 4,988,487, Cl. 423-21.500.

Roussel Uclaf: *See*—
Clemence, Francois; Le Martret, Odile; and Delevallee, Francoise , 4,988,708, Cl. 514-312.000.
Clemence, Francois; and Fortin, Michel, 4,988,727, Cl. 514-422.000.
Clemence, Francois; Fortin, Michel; Le Martret, Odile; and Delevallee, Francoise, 4,988,810, Cl. 544-128.000.
Gourvest, Jean-Francois; Lesuisse, Dominique; Philibert, Daniel; and Vevert, Jean P., 4,988,684, Cl. 514-177.000.
Heymes, Rene ; and Lutz, Andre , 4,988,816, Cl. 548-194.000.

Rowe, Gavin B.; Smith, Andrew N.; and Wooten, Alan, to Lever Brothers Company. Wiping article. 4,987,632, Cl. 15-104.930.

Rowland, Michael E.: *See*—
McKinney, Osborne K.; Eversdyk, David A.; and Rowland, Michael E., 4,988,781, Cl. 526-68.000.

Roy, Dhirendra C., to United Technologies Automotive, Inc. Electrical connector with externally applied radial lock. 4,988,316, Cl. 439-744.000.

Roy, Wolfgang: *See*—
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.

Rubinsak, Gilbert A.; and Frese, Richard. Sectionalized pontoon float. 4,988,317, Cl. 441-46.000.

Rudolph, Karl-Heinz: *See*—
Henkel, Hanno; Rudolph, Karl-Heinz; Sahlmen, Friedhelm; and Brockmann, Rolf, 4,988,234, Cl. 405-36.000.

Rullmann, Helmut; Zellner, Adolf; and Gebhard, Manfred, to Metallgesellschaft Aktiengesellschaft. Vulcanizable binder dispersion composition. 4,988,753, Cl. 524-260.000.

Rumennik, Valdimir: *See*—
Colak, Sel; and Rumennik, Valdimir, 4,989,058, Cl. 357-23.800.

Rumpel, Manfred: *See*—
Oslapas, Algis; and Rumpel, Manfred, 4,987,963, Cl. 180-79.100.

Rundo, John R., to Tremco Incorporated. Method and apparatus for treating the surface of an insulating strip. 4,988,400, Cl. 156-247.000.

Ruoslahti, Erkki I.; Hayman, Edward G.; and Pierschbacher, Michael D., to La Jolla Cancer Research Foundation. Peptides in cell detachment and aggregation. 4,988,621, Cl. 435-240.200.

Rupp, Richard H.: *See*—
Franco, Christopher M. M.; Gandhi, Julia; Chatterjee, Sugata; Reddy, Goukanapalli C. S.; Ganguli, Bimal N.; Rupp, Richard H.; Kogler, Herbert; and Fehlhaber, Hans-Wolfram, 4,988,677, Cl. 514-30.000.

Rush, William F.; Sadowski, Dennis L.; and Todres, Hyman A., to Institute of Gas Technology. Interchangeable automated porting valve. 4,987,924, Cl. 137-614.180.

Russ, Julio G.: *See*—
Macchio, Ralph A.; Slobody, Brent; and Russ, Julio G., 4,988,503, Cl. 424-63.000.

Rutfield, Sharon B.; and Schlitt, Steven C., to GTE Products Corporation. Red fluorescent lamp suitable for reprographic applications. 4,988,914, Cl. 313-486.000.

Rutherford, Cathy O. Method of packaging Christmas lighting. 4,987,724, Cl. 53-399.000.

Ryaa, Jan; and Poulsen, Ole, to Interlego A.G. Toy figure with ball and socket joint. 4,988,324, Cl. 446-383.000.

Ryoke, Katsumi; Takahashi, Masatoshi; and Hashimoto, Akihiro, to Fuji Photo Film Co., Ltd. Magnetic recording media. 4,988,562, Cl. 428-323.000.

Rzeszewski, Theodore S., to AT&T Bell Laboratories. Photonic switch architecture utilizing code and wavelength multiplexing. 4,989,199, Cl. 370-1.000.

S. C. Johnson & Son, Inc.: *See*—
Kessler, Lisa M.; Scholsky, Kevin M.; and Stackman, Robert W., 4,988,763, Cl. 525-61.000.

Sabel Plastechs, Inc.: *See*—
Belcher, Samuel L., 4,988,279, Cl. 425-525.000.

Sabourcau, Christhophe: *See*—
Troupel, Michel; Sibille, Soline; Perichon, Jacques; D'Incan, Esther; and Sabourcau, Christhophe, 4,988,416, Cl. 204-59.00R.

Saccoccio, August J. Method of forming a device including an integrally formed nut. 4,987,761, Cl. 72-335.000.

Sadaoka, Noriyuki; Kumahora, Hiroki; and Miki, Kazuyoshi, to Hitachi, Ltd. Method of and apparatus for evaluating deformation of channel box of fuel assembly for use in nuclear reactor. 4,988,476, Cl. 376-245.000.

Sadowski, Dennis L.: *See*—
Rush, William F.; Sadowski, Dennis L.; and Todres, Hyman A., 4,987,924, Cl. 137-614.180.

Saeki, Junichi: *See*—
Akasaka, Shingo; Sugino, Kazuhiro; Saeki, Junichi; Nishi, Kunihiko; and Onari, Hisashi, 4,989,166, Cl. 364-578.000.

Safco Corporation: *See*—
Wharton, Richard F., 4,988,315, Cl. 439-668.000.

Safetytech Corporation: *See*—
Fenton, Ronald L.; and Brandt, Robert, 4,988,011, Cl. 220-88.100.

Sagady, Calman S.: *See*—
Taplin, Lael B.; and Sagady, Calman S., 4,987,823, Cl. 91-361.000.

Sagucio, Esteban N. Hook-type clothespin. 4,987,660, Cl. 24-567.000.

Sahlmen, Friedhelm: *See*—
Henkel, Hanno; Rudolph, Karl-Heinz; Sahlmen, Friedhelm; and Brockmann, Rolf, 4,988,234, Cl. 405-36.000.

Saiki, Shinichi; and Koide, Kiyoshi, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Mounting structure of switching unit. 4,988,553, Cl. 428-99.000.

Saint, Chapin O.: *See*—
Andrepont, John S.; Wozniak, Robert S.; and Saint, Chapin O., 4,987,922, Cl. 137-592.000.

St. Jean, Guy: *See*—
Bourdages, Michel; Giraldeau, Robert; and St. Jean, Guy, 4,989,115, Cl. 361-126.000.

Saito, Masaki: *See*—
Nagatsuka, Yoshitaka; Ohtsuki, Masayuki; Saito, Masaki; Yoshida, Koji; and Kawabe, Kazuyasu, 4,988,872, Cl. 250-310.000.

Saito, Masao, to NEC Corporation. Demodulator with multiple interference cancellers responsive to correlations between undesired signals and error signals. 4,989,262, Cl. 455-138.000.

Saito, Noboru; Kubo, Haruo; Kotake, Naoyuki; and Nagumo, Makoto, to Nitto Kohki Co., Ltd. Fluid pipe coupling. 4,988,129, Cl. 285-328.000.

Saito, Satoshi: *See*—
Tochio, Yoshiro; Saito, Satoshi; Hiraide, Masaki; Konishi, Hideo; Kuwabara, Hiroshi; and Kokura, Shiro, 4,988,968, Cl. 336-98.000.

Sakabe, Yukio: *See*—
Nishioka, Goro; Watanabe, Shuuji; and Sakabe, Yukio, 4,988,468, Cl. 264-65.000.
Nishioka, Goro; Sakabe, Yukio; and Yamada, Masayuki, 4,988,651, Cl. 501-135.000.
Takagi, Hiroshi; and Sakabe, Yukio, 4,988,650, Cl. 501-134.000.

Sakagami, Kenji: *See*—
Atsumi, Kunio; Iwamatsu, Katsuyoshi; Sakagami, Kenji; Ogino, Hiroko; and Yoshida, Takashi, 4,988,686, Cl. 514-203.000.

Sakaguchi, Akira; Uchibe, Hisashi; and Tange, Toshiyuki, to Kawasaki Jukogyo Kabushiki Kaisha. Method for assembling a structural panel in order to prevent the sag thereof. 4,988,032, Cl. 228-102.000.

Sakaguchi, Haruo; Iwatani, Shiromitsu; and Okao, Toshikatsu, to Hitachi Zosen Corporation. Protective cover for surface of molten steel used in continuous casting apparatus. 4,987,949, Cl. 164-450.000.

Sakaguchi, Masaaki; Kubota, Kazuo; and Ichikawa, Fusao, to Fuji Photo Film Co., Ltd. Joint inspection apparatus. 4,988,204, Cl. 356-430.000.

Sakai, Ikunori: *See*—
Nishio, Takeyoshi; Yokoi, Toshio; Nomura, Takao; Ueno, Kouhei; Akagawa, Tomohiko; Sakai, Ikunori; and Takasaki, Yasufumi, 4,988,764, Cl. 525-66.000.

Sakai, Junro: *See*—
Aketagawa, Kenichi; and Sakai, Junro, 4,987,857, Cl. 118-723.000.

Sakai, Katsuyuki: *See*—
Kotani, Matahira; Matsumoto, Masafumi; Matsumoto, Junichiro; Hayashi, Motohiko; Fujii, Mamoru; Yamanoue, Masafumi; Sakai, Katsuyuki; Mino, Kouichi; Murata, Naomitsu; Inagaki, Hiroya; and Kondo, Mitsunobu, 4,989,237, Cl. 379-100.000.

Sakai, Masahiko; Hayashi, Mithuyuki; and Taniguchi, Toshihisa, to Nippondenso Co., Ltd. Coil assembly for polygonal wire. 4,988,055, Cl. 242-159.000.

Sakai, Tomoharu; Yoshida, Eizo; Mihara, Hiroshi; and Adachi, Toshio, to Sakai, Tomoharu; Dai Nippon Toryo Co., Ltd.; and Meishin Kabushiki Kaisha. Apparatus for removing bubbles in paint and a paint coating system including the bubble removing apparatus. 4,987,852, Cl. 118-603.000.

Sakamoto, Koichiro: *See*—
Ogawa, Minoru; Sakamoto, Koichiro; Tamura, Toshiyuki; and Katsuumi, Kazushige, 4,988,631, Cl. 437-4.000.

Sakamoto, Masahiko: *See*—
Hara, Shigeji; Yoshizawa, Takashi; Kinoshita, Kanae; Sakamoto, Masahiko; Terada, Mitsuhiro; and Suzuki, Youji, 4,988,194, Cl. 356-243.000.

Sakamoto, Mitsutoshi, to Minolta Camera Kabushiki Kaisha. Photosensitive member containing phthaloperinone or naphthalimide. 4,988,592, Cl. 430-58.000.

Sakamoto, Noriaki: *See*—
Kojima, Kunio; Yamane, Daiji; and Sakamoto, Noriaki, 4,989,198, Cl. 369-116.000.

Sakao, Nobuo: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,987,921, Cl. 137-561.00R.

Sako, Yasuhiko: *See*—
Shimizu, Toshimitsu; and Sako, Yasuhiko, 4,989,204, Cl. 370-94.100.

Saksena, Anil K.; Wong, Jesse K.; and Mangiaracina, Pietro, to Schering Corporation. Inhibitors of slow reacting substance of anaphylaxis. 4,988,716, Cl. 514-554.000.

Sakurai, Aki; and Nadachi, Ryoichi, to Kabushiki Kaisha Topcon. Stereo type eye fundus camera. 4,989,023, Cl. 354-62.000.

Salamone, Ann B.; Salamone, Joseph C.; and Olson, Alfred P., to Rochal Industries, Inc. Conformable bandage and coating material. 4,987,893, Cl. 128-156.000.

Salamone, Joseph C.: *See*—
Salamone, Ann B.; Salamone, Joseph C.; and Olson, Alfred P., 4,987,893, Cl. 128-156.000.

Sallade, George J.: *See*—
Groh, Gale A.; and Sallade, George J., 4,987,755, Cl. 70-134.000.

Salmon, John A.; and Jackson, William P., to Burroughs Wellcome Co. N-[1-(3-phenoxyphenyl)ethyl]acetohydroxamic acid compounds which are useful anti-inflammatory agents. 4,988,733, Cl. 514-575.000.

Sampson, Robert; and Flanigan, Sean, to Wasco Products, Inc. Skylight construction. 4,987,705, Cl. 52-72.000.

Samson, Russell H.; and Hollis, John W., Jr., to Daishowa Chemicals Inc. Lignosulfonate based pharmacologic agent with anti-coagulant and anti-thrombotic activity. 4,988,799, Cl. 530-505.000.

SamSung Electronics Co., Ltd.: *See*—
Choi, Choon-Kun, 4,989,243, Cl. 379-402.000.
Jeong, Tae-sung, 4,988,897, Cl. 307-475.000.

Samuelson Group plc: *See*—
Cook, Paul J., 4,988,166, Cl. 350-321.000.

Sanchem, Inc.: *See*—
Bibber, John W., 4,988,396, Cl. 148-269.000.

Sand, Theodor: *See*—
Bruning, Jurgen; Emberger, Roland; Guntert, Matthias; Hopp, Rudolf; Kopsel, Manfred; Sand, Theodor; and Werkhoff, Peter, 4,988,526, Cl. 426-535.000.

Sanden Corporation: *See*—
Shimazaki, Seiji; and Imai, Soichiro, 4,988,071, Cl. 248-666.000.

Sander, Ingolf; and Marchant, Alan B., to Eastman Kodak Company. Magneto-optic playback apparatus including astigmatic diffracting means. 4,989,189, Cl. 369-13.000.

Sanders, Edgar S., Jr.: *See*—
Jeanes, Thomas O.; Summers, John D.; and Sanders, Edgar S., Jr., 4,988,371, Cl. 55-16.000.

Sanderson, Arthur C.: *See*—
Nayar, Shree K.; Sanderson, Arthur C.; Weiss, Lee E.; and Simon, David A., 4,988,202, Cl. 356-394.000.

Sandoz Ltd.: *See*—
Azria, Moise, 4,988,512, Cl. 424-422.000.
Linder, Jerome, 4,988,789, Cl. 562-575.000.

Sandved, Jonas S.: *See*—
Horvei, Knut; and Sandved, Jonas S., 4,988,538, Cl. 427-53.100.

Sandvik AB: *See*—
Pettersson, Lars T.; and Wiman, Jorgen V., 4,988,242, Cl. 407-114.000.

Sano, Inc.: *See*—
Millevoi, Eugenio; and Brydel, Paul S., 4,988,471, Cl. 264-211.120.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Ito, Saburo, 4,988,996, Cl. 340-984.000.

Santa Barbara Research Center: *See*—
Ahlgren, William L., 4,987,855, Cl. 118-722.000.

Santane Csutor, Andrea: *See*—
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Santangelo, Francesco: *See*—
Casagrande, Cesare; Santangelo, Francesco; and Calabi, Maria L., 4,988,735, Cl. 514-648.000.

Santel, Hans-Joachim: *See*—
Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,378, Cl. 71-90.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,380, Cl. 71-90.000.
Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.

Santowski, Klaus; Leupold, Hermann; and Angeler, Alois, to Didier-Werke AG. Silica bricks and process for production thereof. 4,988,649, Cl. 501-133.000.
Sanyo Electric Co., Ltd.: *See*—
Awajitani, Takahisa; Terasaka, Masayuki; Takemura, Masakazu; and Honda, Hironori, 4,988,589, Cl. 429-222.000.
Fujimoto, Mitsuo; and Kitamura, Toru, 4,989,250, Cl. 381-51.000.
Fuse, Chihiro; and Morita, Yutaka, 4,989,240, Cl. 379-355.000.
Oka, Ryu-ichi; and Matsumura, Hiroshi, 4,989,249, Cl. 381-43.000.
Sardano, Peter A.; Fish, David J.; and Sturnick, Gerard R., to Xerox Corporation. Sheet Stacker. 4,988,087, Cl. 271-314.000.
Sardar, Zuhdi. Connector. 4,988,314, Cl. 439-628.000.
Sasaki, Haruo: *See*—
Yamashita, Seiya; and Sasaki, Haruo, 4,987,846, Cl. 114-265.000.
Sasaki, Hiroaki; Fukuda, Yukio; and Shimizu, Toshio, to Nippondenso Co., Ltd. Fault inspection system for rotary machines. 4,988,979, Cl. 340-683.000.
Sasaki, Hitoshi: *See*—
Kobayashi, Yukio; Sasaki, Hitoshi; and Igota, Shoji, 4,988,013, Cl. 220-276.000.
Sasaki, Shigeru; Kawauchi, Masataka; and Hamada, Yasunori, to Hitachi, Ltd. Financial transaction system. 4,988,849, Cl. 235-379.000.
Sasaki, Shoko: *See*—
Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,988,712, Cl. 514-340.000.
Sasho, Hidehiko, to Sony Corporation. Tape synchronizing apparatus having self-correcting offset calculation. 4,989,101, Cl. 360-14.300.
Sasse, Howard A. Golf puter including sight bar. 4,988,107, Cl. 273-183.00D.
Sato, Masanori, to Sony Corporation. Tape cassette utilizing fiber optic bundle. 4,989,111, Cl. 360-132.000.
Sato, Masayasu: *See*—
Kuroe, Shigeru; Takeda, Takayuki; and Sato, Masayasu, 4,989,190, Cl. 369-32.000.
Sato, Masayuki: *See*—
Tomono, Makoto; Tarumi, Noriyoshi; and Sato, Masayuki, 4,988,598, Cl. 430-99.000.
Sato, Satoshi; and Ichigaya, Hiroshi, to Sony Corporation. Apparatus for testing and adjusting color cathode ray tube equipment. 4,989,072, Cl. 358-10.000.
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Diehr, Hans-Joachim; Fest, Christa; Kirsten, Rolf; Kluth, Joachim; Muller, Klaus-Helmut; Pfister, Theodor; Priesnitz, Uwe; Riebel, Hans-Jochem; Roy, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Eue, Ludwig, 4,988,379, Cl. 71-90.000.
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Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.

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Schmitt, Marcella H. Portable, safety, play furniture assembly. 4,988,090, Cl. 272-56.50R.

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Lochbronner, Hubert, 4,988,048, Cl. 242-18.00R.

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Selman, Steven H.: *See*—
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Taguchi, Toshihiko; Asano, Shozo; Osawa, Ken'ichi; Nagai, Hiroo; and Ikeda, Hisao, 4,988,395, Cl. 148-24.000.

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Good, Stanley B.; La Fond, John A.; Lachat, Michael J.; and Shah, Dinesh B., 4,988,118, Cl. 280-743.000.
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Ishii, Mitsuo; Kurata, Yukio; and Yamaoka, Hideyoshi, 4,988,165, Cl. 350-245.000.
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Kobayashi, Toshiaki; and Iwai, Shougo, 4,989,038, Cl. 355-202.000.
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Shell Oil Company: *See*—
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Del Prato, Daniel J.; McKenna, David R.; and Larson, Sherman L., 4,988,042, Cl. 239-263.000.
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Shiokawa, Kozo; Tsuboi, Shinichi; Sasaki, Shoko; Moriya, Koichi; Hattori, Yumi; and Shibuya, Katsuhiko, 4,988,712, Cl. 514-340.000.
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Shimano Industrial Company Limited: *See*—
Hitomi, Yasuhiro, 4,988,057, Cl. 242-245.000.
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Sasaki, Hiroaki; Fukuda, Yukio; and Shimizu, Toshio, 4,988,979, Cl. 340-683.000.
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Fukuda, Takeshi; Fukushima, Motoo; Itoh, Kunio; and Fujiki, Hironao, 4,988,758, Cl. 524-492.000.
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Yaguchi, Fumihiro, 4,988,904, Cl. 310-12.000.
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Shinoda, Norio: *See*—
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Shiotani, Tadahiko; and Watanabe, I., to Kunimori-Kagaku Co., Ltd. Golf club head and process for its fabrication. 4,988,104, Cl. 273-167.00H.
Shioya, Makoto: *See*—
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Shkedi, Zvi; Lepkowski, James S.; Pogany, Karl S., Jr.; and Meyer, Gerald W., to Allied-Signal Inc. Capacitive pressure transducer system. 4,987,782, Cl. 73-718.000.
Shockey, Winfred S. Self-operated stand up support apparatus. 4,987,622, Cl. 5-81.00R.
Shockley, Gary, to Shockley, Gary. Acoustic and electric combination guitar. 4,987,815, Cl. 84-291.000.
Shoda, Isao; Kodama, Hitoshi; Magome, Kazuo; Iwata, Akihiko; Yoshizawa, Kenji; and Taki, Masakazu, to Mitsubishi Denki Kabushiki Kaisha. Power supply for microwave discharge light source. 4,988,922, Cl. 315-223.000.
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Shortall, John F., to Designcraft International Ltd. Retractable seat attachment for foldable caddy cart. 4,988,117, Cl. 280-646.000.
Shotey, Michael J. Recessed electrical outlet with cover. 4,988,832, Cl. 174-67.000.
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Shu, Donald G. C.; Stein, Norbert J.; and Hamrick, Claude A. S. Tennis racket with separable head and handle assembly. 4,988,100, Cl. 273-73.00C.
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Sicka, Richard W.; Tompkins, Dale A.; and Kundig, Peter, to Bridgestone/Firestone, Inc. Tubular sleeve handling and cut-off system. 4,987,808, Cl. 83-13.000.
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Siegel, Marvin I.: *See*—
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Siegers, Gunter: *See*—
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Siemens Aktiengesellschaft: *See*—
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Bornhauser, Christian, 4,988,375, Cl. 65-59.400.
Paul, Bernt-Joachim, 4,988,199, Cl. 356-368.000.
Reng, Leonhard, 4,988,940, Cl. 318-800.000.
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Wittchow, Eberhard; and Koehler, Wolfgang, 4,987,862, Cl. 122-6.00A.
Siemens-Bendix Automotive Electronics L.P.: *See*—
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Sierk, Dennis A.: *See*—
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Sievers, Axel: *See*—
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Siguyama, Keiichi: *See*—
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Simko, Richard T., to Information Storage Devices, Inc. High density integrated circuit analog signal recording and playback system. 4,989,179, Cl. 365-45.000.
Simmons, William L. Faucet using a cistern pump handle and a water mixing valve. 4,987,926, Cl. 137-625.400.
Simms, Garfield: *See*—
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Sinai-Zingde, Gurudus D.: *See*—
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Sing, Yuen-Lung L.; and Lee, Len F., to Monsanto Company. Pentasubstituted pyridine compounds, herbicidal compositions and herbicidal method of use. 4,988,384, Cl. 71-94.000.
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Sintris S.r.L.: *See*—
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Sivavec, Timothy M.; and McCormick, Sharon J., to General Electric Company. Dicarboxylate-capped polyphenylene ether with trimellitic acid anhydride salicylate ester. 4,988,775, Cl. 525-397.000.
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Slayton, Danny L.; Tompkins, E. Neal; Lak, Khosrow; and Palm, Charles S., to Colorocs Corporation. Method for removal and addition of developer to a toner module in an electrophotographic print engine. 4,989,045, Cl. 355-260.000.
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Slobody, Brent: *See*—
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Sluyterman, Albertus A. S.; and Vrinten, Marinus L. A., to U.S. Philips Corporation. Color cathode ray tube system with reduced spot growth. 4,988,926, Cl. 315-368.000.
Smart, Charles F.; Varian, Raymond H.; and D'Aquila, Anthony, to Emhart, Inc. Automatic riveting machine. 4,988,028, Cl. 227-3.000.
Smith, Andrew N.: *See*—
Rowe, Gavin B.; Smith, Andrew N.; and Wooten, Alan, 4,987,632, Cl. 15-104.930.
Smith, Frank P., II; Krishan, Thomas R.; and McAdams, Hugh P., Jr., to Litton Systems, Inc. Multifrequency antenna having a DC power path. 4,989,013, Cl. 343-721.000.
Smith, Jerry W.; and Sullivan, Nadine M., to Difco Laboratories Incorporated. Culture media package. 4,988,302, Cl. 435-298.000.
Smith, John, III: *See*—
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Brown, Thomas H.; and Blurton, Peter, 4,988,695, Cl. 514-248.000.
Smith, Lee A. Modular bathing cabinet and method of fabricating same. 4,987,619, Cl. 4-612.000.
Smith-Lewis, Margaret J., to Eastman Kodak Company. Test device with dried reagent drops on inclined wall. 4,988,627, Cl. 436-165.000.
Smith, Patricia B.: *See*—
Freeman, Dean W.; Luttmer, Joseph D.; Smith, Patricia B.; and Davis, Cecil J., 4,988,533, Cl. 427-38.000.

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Smith, Robert W.; McIntyre, John J.; and Chow, Marland, to Actiwear, Ltd. Combination exercise and refreshment device. 4,988,097, Cl. 272-119.000.
Smith, Sandra L., to Hoover Universal, Inc. Method of making covers for foam bodies using a seam stabilizer. 4,987,666, Cl. 29-91.100.
Smith, Sidney R.: *See—*
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Smith, Terrance P.; Zaklika, Krzysztof A.; Jongewaard, Susan K.; and Leichter, Louis M., to Minnesota Mining and Manufacturing Company. Thermal transfer imaging using alkylcarbonylamino-anthraquinone dyes. 4,988,664, Cl. 503-227.000.
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Snyder, Susan L. Method of selective hair coloring and coloring comb for practicing method. 4,987,909, Cl. 132-202.000.
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Societe Anonyme: Compagnie Generale des Mattieres Nucleaires: *See—*
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Societe Anonyme dite: Compagnie Lyonnaise de Transmissions Optiques: *See—*
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Societe Anonyme dite: S. A. Andre Boet: *See—*
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Solar Press, Inc.: *See—*
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Solomon, Allen L., to Grumman Aerospace Corporation. Graphotaxially forming a photosensitive detector array. 4,988,641, Cl. 437-83.000.
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Sones, William, to Noninvasive Medical Incorporated. Method and device for the non-invasive measurement of pressure. 4,987,898, Cl. 128-645.000.
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Miyagawa, Masayuki; Itabashi, Takao; Yamada, Hisafumi; and Osakabe, Yoshio, 4,989,081, Cl. 358-93.000.
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Soong, Tsai C. Shock absorbing string post for sports rackets. 4,988,101, Cl. 273-73.00D.
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Sorenson, Richard W., to Carlingswitch, Inc. Off-set terminal configuration for electrically coupling the load side of adjacent circuit breakers. 4,989,118, Cl. 361-376.000.
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Soto, Roy L.; Ehrke, Wiley J.; and Homkes, Robert J., to Harris Corporation. ISDN testing device and method. 4,989,202, Cl. 370-13.000.
Soto, Wilson F. Liquid level indicator for storage tanks. 4,988,978, Cl. 340-624.000.
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Spanjer, Tjerk G.; Vrijssen, Gerardus A. H. M.; and Van Alphen, Willem M., to U.S. Philips Corporation. Picture display device. 4,988,929, Cl. 315-382.000.
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Spaulding, George E. Spring clamp. 4,987,652, Cl. 24-20.00R.
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Jentsch, Christopher A.; and Spector, George, 4,988,039, Cl. 232-1.00C.
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Gatten, Ronald A.; and Joba, Lawrence R., 4,989,016, Cl. 346-1.100.
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Spencer, Charles M. Medical appliance holder. 4,988,296, Cl. 433-163.000.
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Spencer, R. Wilson. Constant volume sampling system. 4,987,785, Cl. 73-863.710.
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Gilligan, Lawrence H., 4,988,196, Cl. 356-308.000.
Spiewak, John W.; Yuh, Huoy-Jen; Thornton, Constance J.; Abramsohn, Dennis A.; Nichol-Landry, Deborah; and Mammino, Joseph, to Xerox Corporation. Conductive and blocking layers for electrophotographic imaging members. 4,988,597, Cl. 430-62.000.
Spinelli, Silvano: *See—*
Di Domenico, Roberto; Gandolfi, Carmelo A.; Spinelli, Silvano; Lumachi, Bruno; Tofanetti, Odoardo; and Tognella, Sergio, 4,988,701, Cl. 514-255.000.
Spitzer, Charles M.; and Siegel, Paul F., to A-Bee Syndicate, Inc. Stackable tray carrying units. 4,988,003, Cl. 206-511.000.
Sport Supply Group, Inc.: *See—*
Miller, James M., 4,988,098, Cl. 272-134.000.
Sprague Electric Company: *See—*
Gouvernelle, Didier, 4,989,119, Cl. 361-534.000.
Sprinkel, F. Murphy; Morgan, Constance H.; and Losee, D. Bruce, Jr., to Philip Morris Incorporated. Thermal indicators for smoking articles. 4,987,908, Cl. 131-365.000.
Spruck, Manfred, to Deutsche Thomson-Brandt GmbH. Deflection circuit for a television picture tube. 4,988,927, Cl. 315-371.000.
Spryn, Richard: *See—*
Dimmick, Henry M.; Schneider, Paul; and Spryn, Richard, 4,987,768, Cl. 73-37.500.
Srinivasan, Ananthachari; Fritzberg, Alan R.; and Jones, David S., to NeoRx Corporation. Metal radionuclide chelating compounds for improved chelation kinetics. 4,988,496, Cl. 424-1.100.
Staats, Norman O.: *See—*
Kistner, Anthony S.; Staats, Wayne M.; and Staats, Norman O., 4,987,763, Cl. 72-353.400.
Staats, Wayne M.: *See—*
Kistner, Anthony S.; Staats, Wayne M.; and Staats, Norman O., 4,987,763, Cl. 72-353.400.
Stackman, Robert W.: *See—*
Kessler, Lisa M.; Scholsky, Kevin M.; and Stackman, Robert W., 4,988,763, Cl. 525-61.000.
Stamet, Inc.: *See—*
Firth, Donald, 4,988,239, Cl. 406-99.000.
Stamicarbon B. V.: *See—*
Vriesema, Bindert K., 4,988,776, Cl. 525-425.000.
Stanadyne Automotive Corp.: *See—*
Kelly, William W., 4,987,887, Cl. 123-467.000.
Stanisiere, Claude: *See—*
Boyle, Bruce W.; Stanisiere, Claude; and Delpuech, Alain, 4,987,969, Cl. 181-102.000.
Stapleton, Craig A.: *See—*
Rasor, William; and Stapleton, Craig A., 4,988,026, Cl. 224-321.000.
Star Sprinkler Corporation: *See—*
Galaszewski, William, 4,987,957, Cl. 169-37.000.

Stark, Francis M., Jr.: *See*—
Moon, John D.; Sheridan, Margaret M.; and Stark, Francis M., Jr., 4,988,742, Cl. 522-79.000.

Staubel, Max: *See*—
Hofer, Gerald; Laufer, Helmut; and Staubel, Max, 4,987,875, Cl. 123-449.000.

STC PLC: *See*—
Harding, Ian D.; Ince, Peter R.; and Preston, Roger S., 4,988,374, Cl. 65-2.000.
Turner, Andrew S.; Hext, Trevor E. J.; and Janssen, Adrian P., 4,988,159, Cl. 350-96.200.

Stealey, Michael A.; and Weier, Richard M., to G. D. Searle & Co. Pharmacologically active phenylalkanoyl substituted imidazo (4,5-C) pyridines. 4,988,707, Cl. 514-303.000.

Stegelman, Albert F.; and Bichler, David F., to Phillips Petroleum Company. Combustion apparatus and method. 4,988,287, Cl. 431-284.000.

Steidle, Werner: *See*—
Mielke, Siegfried; Weber, Wilfried; and Steidle, Werner, 4,987,866, Cl. 123-193.00P.

Stein, Judith, to General Electric Company. Controlled release compositions and use. 4,988,741, Cl. 522-31.000.

Stein, Norbert J.: *See*—
Shu, Donald G. C.; Stein, Norbert J.; and Hamrick, Claude A. S., 4,988,100, Cl. 273-73.00C.

Steiner, Karl: *See*—
Meinecke, Albrecht; and Steiner, Karl, 4,988,410, Cl. 162-360.100.

Steinke, Charles W. Undercarriages. 4,988,115, Cl. 280-404.000.

Stemco Inc.: *See*—
Lutts, William P.; Diefenbaker, Thomas A.; and Fedorovich, George, 4,989,222, Cl. 377-24.100.

Stensland, David A., to Navistar International Transportation Corp. Electromagnetically locking mirror glass adjusting system. 4,988,179, Cl. 350-637.000.

Stenzel, Gerhard: *See*—
Heckenkamp, Christoph; Stenzel, Gerhard; and Kaule, Wittich, 4,988,126, Cl. 283-92.000.

Sterer Engineering and Manufacturing Company: *See*—
Kluczynski, Mathew L., 4,987,927, Cl. 137-625.650.

Sterkin, Viktor E.: *See*—
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

Sterling Drug Inc.: *See*—
Bailey, Denis M.; and Powles, Ronald G., 4,988,725, Cl. 514-406.000.

Stern, Kenneth J.; and Bily, Stephen F., to Crystal Semiconductor Corporation. Low power output stage circuitry in an amplifier. 4,988,954, Cl. 330-264.000.

Sternberger, Klaus; and Keil, Karl-Heinz, to Hoechst Aktiengesellschaft. Process for the dyeing and printing of cellulose fibers in the absence of alkali or reducing agents: pre treatment with modified amine. 4,988,365, Cl. 8-543.000.

Sternheimer, Arthur: *See*—
Nilsen, Carl G.; Weisling, Gary L.; Sternheimer, Arthur; Montes, Ralph A.; and Schoen, Douglas R., 4,988,556, Cl. 428-195.000.

Sterns Metals Inc.: *See*—
Cash, Richard, Sr., 4,987,762, Cl. 72-349.000.

Stetz, Thomas T.: *See*—
Mauer, Andrew J.; and Stetz, Thomas T., 4,987,853, Cl. 118-657.000.

Stevens, James K.: *See*—
Aliberti, Vincent A.; and Stevens, James K., 4,988,749, Cl. 524-159.000.

Stevens, Melvyn J. W., to Augustus Martin Limited. Edge sharpening. 4,987,810, Cl. 83-176.000.

Stewart, Roger G.; and Plus, Dora, to General Electric Company. Radiation hard memory cell structure with drain shielding. 4,989,061, Cl. 357-41.000.

Steyr-Daimler-Puch AG: *See*—
Moser, Franz, 4,987,741, Cl. 60-599.000.

Stibal, Werner; and Blum, Albert, to Ems-Inventa AG. Apparatus for cooling and conditioning melt-spun material. 4,988,270, Cl. 425-72.200.

Stichting Rega VZW: *See*—
De Clercq, Erik; and Iigo, Masaaki, 4,988,678, Cl. 514-50.000.

Stiles, Steven D.; and Reinke, Paul E., to General Motors Corporation. Method and means for determining air mass in a crankcase scavenged two-stroke engine. 4,987,773, Cl. 73-118.200.

Stix, Marsha S.: *See*—
Ortiz, Marcos G.; and Stix, Marsha S., 4,988,875, Cl. 250-330.000.

Stoepel, Kurt: *See*—
Wehinger, Egbert; Meyer, Horst; Bosseret, Friedrich; Vater, Wulf; Towart, Robertson; Stoepel, Kurt; and Kazda, Stanislav, 4,988,717, Cl. 514-356.000.

Stohr, Frank M.; Henk, Hermann; and Herd, Karl-Josef, to Bayer Aktiengesellschaft. Fiber reactive azo dyes containing a morpholinyl-, piperazinyl- or piperidnyl- substituted flurotriazinyl radical. 4,988,803, Cl. 534-635.000.

Stokowksi, Stanley; Wolze, David; and Neukermans, Armand P., to Tencor Instruments. Via hole checker. 4,988,877, Cl. 250-358.100.

Stoll, Kurt, to Festo KG. Linear actuator. 4,987,822, Cl. 91-358.00R.

Stone, Harold S., to International Business Machines Corporation. Technique for parallel synchronization. 4,989,131, Cl. 364-200.000.

Stongwater Murray. Reinforced glove for inhibiting runs. 4,987,614, Cl. 2-163.000.

Storage Technology Corporation: *See*—
Dunphy, Robert H., Jr.; Walsh, Robert; and Bowers, John H., 4,989,205, Cl. 371-10.100.
Dunphy, Robert H., Jr.; Walsh, Robert; and Bowers, John H., 4,989,206, Cl. 371-10.100.
O'Brien, John T., 4,988,998, Cl. 341-55.000.

Storti, Sandro; Murari, Bruno; and Consiglieri, Franco, to SGS-Thomson Microelectronics s.r.l. Bridge circuit having polarity inversion protection means entailing a reduced voltage drop. 4,989,114, Cl. 361-84.000.

Storz Instrument Company: *See*—
Engebretson, A. Maynard; and Fredrickson, John, 4,988,333, Cl. 600-25.000.

Strader, James O., Jr.: *See*—
Kennedy, Lawrence C.; and Strader, James O., Jr., 4,987,986, Cl. 192-58.00B.

Strang, Harry: *See*—
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,378, Cl. 71-90.000.
Forster, Heinz; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,380, Cl. 71-90.000.
Muller, Klaus-Helmut; Kirsten, Rolf; Kluth, Joachim; Konig, Klaus; Riebel, Hans-Jochem; Babczinski, Peter; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,988,381, Cl. 71-92.000.

Straub, Melvin J.; Kalash, Edwin; and Swenson, Douglas A., to Minnesota Mining and Manufacturing Company. Cross web layer application device. 4,987,940, Cl. 156-164.000.

Straw, Andrew G.: *See*—
Mellender, Fredric H.; Straw, Andrew G.; and Riegel, Stephen E., 4,989,132, Cl. 364-200.000.

Streck, Donald A.: *See*—
Iggulden, Jerry R.; and Streck, Donald A., 4,989,238, Cl. 379-100.000.

Streich, Georg; Gnahn, Gunter; and Held, Kurt, to Siemens Aktiengesellschaft. Electromagnetic switchgear. 4,988,964, Cl. 335-131.000.

Streitberger, Hans J.: *See*—
Batzill, Wolfgang; Heilmann, Ulrich; Streitberger, Hans J.; Guder, Harald; and Beck, Fritz, 4,988,420, Cl. 204-181.100.

Strittmatter, Donald J.; and Wickholm, David R., to Hughes Aircraft Company. Optical magnifying system. 4,988,175, Cl. 350-469.000.

Stroech, Klaus; Brandes, Wilhelm; and Dutzmann, Stefan, to Bayer Aktiengaesellschaft. Fungicidal and plant growth-regulating azolylmethyl-cyclopropyl derivatives. 4,988,819, Cl. 548-267.800.

Strom, Sven B.: *See*—
Griesedieck, Henry C., III; and Strom, Sven B., 4,988,045, Cl. 241-36.000.

Strommer, Erich, to Novophalt Overseas S.A. Process for preparing a bituminous binder modified with plastics for building materials. 4,988,747, Cl. 524-59.000.

Strongin, Alexander Y.: *See*—
Kozlov, Jury I.; Nardoditskaya, Vera A.; Eremashvili, Marina R.; Strongin, Alexander Y.; Sterkin, Viktor E.; Skvortsova, Marina A.; Chistoserdov, Andrei J.; Tsygankov, Jury D.; Evdonina, Ljudmila V.; Jurin, Vitaly L.; Monastyrskaya, Galina S.; Sverdlov, Evgeny D.; Dolganov, Grigory M.; and Tsarev, Sergei A., 4,988,622, Cl. 435-252.340.

Strump, Marlies: *See*—
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Struttmann, James D.: *See*—
Satterfield, Nathaniel J.; and Struttmann, James D., 4,987,678, Cl. 29-868.000.

Stryker Corporation: *See*—
Stryker, Martin W.; and Fennell, Thomas W., 4,987,623, Cl. 5-86.000.

Stryker, Martin W.; and Fennell, Thomas W., to Stryker Corporation. Hospital stretcher having patient transfer device and side rails with handle portions. 4,987,623, Cl. 5-86.000.

Studtmann, George H.: *See*—
Miller, Alan L.; Studtmann, George H.; King, Todd L.; Gallaher, Kenneth R.; Zawada, Jerome J.; and Umlauf, William P., 4,988,967, Cl. 335-279.000.

Stump, John L.: *See*—
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Stumpp, Herman: *See*—
Dietrich, Walter; Ranke, Horst; Stumpp, Herman; and Heuser, Claus, 4,988,844, Cl. 219-121.170.

Sturm, Gerd: *See*—
Allekotte, Heinz A.; and Sturm, Gerd, 4,989,122, Cl. 362-97.000.

Sturnick, Gerard R.: *See*—
Sardano, Peter A.; Fish, David J.; and Sturnick, Gerard R., 4,988,087, Cl. 271-314.000.

Subramanyam, Vinayakam: *See*—
Bergstein, Paul L.; and Subramanyam, Vinayakam, 4,988,827, Cl. 549-451.000.

Suda, Kenichi: *See—*
Hayashi, Kimiyoshi; Suda, Kenichi; and Hirooka, Kazuhiko, 4,989,039, Cl. 355-208.000.

Sugimoto, Kenji, to Dainippon Screen Mfg. Co., Ltd. Rotary wafer drier. 4,987,687, Cl. 34-58.000.

Sugino, Kazuhiro: *See—*
Akasaka, Shingo; Sugino, Kazuhiro; Saeki, Junichi; Nishi, Kunihiko; and Onari, Hisashi, 4,989,166, Cl. 364-578.000.

Sugitani, Yuji; Kanjo, Yoshihiro; and Nishimura, Takanori, to NKK Corporation. Apparatus for detecting a shape of a groove. 4,988,201, Cl. 356-376.000.

Sugiura, Takashi: *See—*
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Sullivan, Nadine M.: *See—*
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Sulzer Brothers Limited: *See—*
Frey, Otto; and Koch: Rudolf, 4,988,359, Cl. 623-23.000.

Sumi, Noriaki, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor package. 4,989,066, Cl. 357-68.000.

Sumida, Yoshihiro: *See—*
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Sumitomo Chemical Company, Limited: *See—*
Tanaka, Toshihiko; and Doi, Shuji, 4,988,608, Cl. 430-325.000.

Sumitomo Electric Industries, Ltd.: *See—*
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,988,670, Cl. 505-1.000.
Tsuchimoto, Junichi; Yamada, Tooru; and Miyano, Takaya, 4,989,065, Cl. 357-67.000.

Sumitomo Heavy Industries, Ltd.: *See—*
Yamanaka, Masao, 4,988,250, Cl. 414-141.100.

Summagraphics Corporation: *See—*
Murray, Wayne J., 4,988,836, Cl. 178-18.000.

Summerlin, Frederick A. Blind rivet and method of making same. 4,988,247, Cl. 411-38.000.

Summers, John D.: *See—*
Jeanes, Thomas O.; Summers, John D.; and Sanders, Edgar S., Jr., 4,988,371, Cl. 55-16.000.

Sun, Mei H.; Wickersheim, Kenneth A.; and Heinemann, Stanley O., to Luxtron Corporation. Fiberoptic sensing of temperature and/or other physical parameters. 4,988,212, Cl. 374-161.000.

Sundstrand Corporation: *See—*
Nguyen, Tuan H., 4,987,795, Cl. 74-606.00R.

Sung Bo Ind. Co., Ltd.: *See—*
Kim, Hae Y., 4,987,628, Cl. 12-17.00R.

Supra Products, Inc.: *See—*
Barrett, Philip D.; Henderson, Walter G.; and Larson, Wayne F., 4,988,987, Cl. 340-825.310.

Susaki, Shigeru: *See—*
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Suwa, Kouichi: *See—*
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Suzuki, Harumi: *See—*
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Suzuki, Keitaro: *See—*
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Suzuki, Koji; Oyama, Hajime; Namekata, Shinichi; Sawai, Yuji; and Yoo, Hideo, to Ricoh Company, Ltd. Color-balance control method. 4,989,043, Cl. 355-246.000.

Suzuki, Kouichi: *See—*
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, 4,988,732, Cl. 514-560.000.

Suzuki, Masami: *See—*
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Suzuki, Mitsuhiro, to Sony Corporation. Radio receiver with automatic mode changeover circuit. 4,989,263, Cl. 455-182.000.

Suzuki Motor COmpany Ltd.: *See—*
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Suzuki, Mutsuko: *See—*
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Suzuki, Satoshi: *See—*
Arita, Setsuo; Ito, Tetsuo; Suzuki, Satoshi; and Noguchi, Atomi, 4,989,129, Cl. 364-187.000.

Suzuki, Takao; Takekawa, Katsumi; Tokaichi, Tetsuro; and Umesato, Shoji, to Japan Aviation Electronics Industry, Limited; and NEC Corporation. Coaxial connector for connecting coaxial cable contacts with printed circuit boards. 4,988,312, Cl. 439-581.000.

Suzuki, Takeshi: *See—*
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, 4,988,732, Cl. 514-560.000.

Suzuki, Tatsuya; and Matsutani, Shunji, to Olympus Optical Co., Ltd. Bifocal camera. 4,989,026, Cl. 354-150.000.

Suzuki, Tsutomu, to Pioneer Electronic Corporation. Disk recording-/reproducing system using disk identification signal to retrieve stored control parameters. 4,989,195, Cl. 369-50.000.

Suzuki, Yasoji: *See—*
Takiba, Akira; Murata, Hiroyoshi; Suzuki, Yasoji; and Abe, Isao, 4,988,894, Cl. 307-296.100.

Suzuki, Yoshihiro; Ogiwara, Toshio; and Kudo, Masaaki, to Izumi Industries, Ltd. Piston for internal combustion engines. 4,987,867, Cl. 123-193.00P.

Suzuki, Yoshikazu: *See—*
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, 4,988,732, Cl. 514-560.000.

Suzuki, Youji: *See—*
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Svenkeson, John W.; and Murphy, Patrick J., to Unisys Corp. High density connectors. 4,988,305, Cl. 439-65.000.

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Swaim, Ronnie D.: *See—*
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Swapp, Mavin C.: *See—*
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Swenson, Douglas A.: *See—*
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Sybertz, Edmund J.: *See—*
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Syntex (U.S.A.) Inc.: *See—*
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Szablikowski, Klaus: *See—*
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Szego, Andras: *See—*
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Szekely, Tamas; Nagy, Gabor; Danko, Andras; Szepvolgyi, Janos; Gal, Andras; and Libor, Oszkar, to Altalanos Iparfejlesztesi Rt. Method for improving the strength and impermeability of soils and engineering structures. 4,988,238, Cl. 405-263.000.

Szekeres, Laszlo: *See—*
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Szepvolgyi, Janos: *See—*
Szekely, Tamas; Nagy, Gabor; Danko, Andras; Szepvolgyi, Janos; Gal, Andras; and Libor, Oszkar, 4,988,238, Cl. 405-263.000.

Szpak, Anthony D.: *See—*
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T W Kutter Inc.: *See—*
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Tabuse, Hidetoshi, to Koyo Seiko Co., Ltd. Electric power steering system. 4,987,964, Cl. 180-79.100.

Tachi-S Co., Ltd.: *See—*
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Tackett, Wendell D., to Allied-Signal Inc. Solenoid valve. 4,987,923, Cl. 137-596.170.

Tada, Satomi: *See—*
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Tagaya, Osamu: *See—*
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Taguchi, Nobuyoshi; Imai, Akihiro; Murata, Yukichi; and Hirota, Takao, to Mitsubishi Kasei Corporation; and Matsushita Electric Industrial Co., Ltd. Thermal dye transfer sheet. 4,988,666, Cl. 503-227.000.

Taguchi, Toshihiko; Asano, Shozo; Osawa, Ken'ichi; Nagai, Hiroo; and Ikeda, Hisao, to Senju Metal Industry Co., Ltd.; and Nissan Chemical Industries Ltd. Water-soluble soldering flux and paste solder using the flux. 4,988,395, Cl. 148-24.000.

Tai, Yoshimasa: *See—*
Yamamoto, Tetsuya; Moriya, Takashi; and Tai, Yoshimasa, 4,988,222, Cl. 400-124.000.

Tajima, Mizuho: *See—*
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Tajiri, Noriyuki: *See*—
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Takaba, Tetsuro: *See*—
Minamitani, Kunitomo; Takaba, Tetsuro; Yamashita, Terufumi; and Nishikawa, Toshihide, 4,987,876, Cl. 123-492.000.

Takada, Mitsuru: *See*—
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Tanaka, Kazuna: *See*—
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Tanzola, Charles, to AT&T Bell Laboratories. Terminal blocks. 4,988,311, Cl. 439-404.000.
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Tirelli, Marco; Rouchy, Didier; and Rapeau, Jean-Claude, to General Electric CGR S.A. Cassette carrier adaptable in size and position for mammography. 4,989,227, Cl. 378-177.000.

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Murphy, Walter T.; Tseng, Hsiungto S.; and Kolycheck, Edmond G., 4,988,574, Cl. 428-425.900.

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Roy, Dhirendra C., 4,988,316, Cl. 439-744.000.
United Technologies Corporation: *See—*
McBrien, Gregory J., 4,987,779, Cl. 73-517.00B.
Reavely, Richard T.; and Kim, Wonsub, 4,988,469, Cl. 264-113.000.
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Buckberg, Gerald D., 4,988,515, Cl. 424-529.000.
Universal Instruments Corporation: *See—*
York, James E., 4,988,935, Cl. 318-568.180.
University of California, The Regents of the: *See—*
Aberth, William, 4,988,869, Cl. 250-281.000.
University of Florida, The: *See—*
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Adrian, Ronald J.; and Landreth, Christopher C., 4,988,191, Cl. 356-28.000.
Curtis, Stanley E.; and Taylor, Ian A., 4,987,858, Cl. 119-54.000.
University of Minnesota, Regents of the: *See—*
Ugurbil, Kamil; and Garwood, Michael, 4,988,947, Cl. 324-307.000.
University of Pittsburgh: *See—*
Kozikowski, Alan P., 4,988,682, Cl. 514-150.000.
University of Toledo, The: *See—*
Morgan, Alan R.; and Selman, Steven H., 4,988,808, Cl. 540-145.000.
UOP: *See—*
Sechrist, Paul A.; Lomas, David A.; and Myers, Daniel N., 4,988,430, Cl. 208-113.000.
Upadhya, Kamleshwar, to General Electric Company. Titanium carbide coating of bearing components. 4,988,534, Cl. 427-38.000.
Upjoin Company, The: *See—*
Hoffman, Dalyn C., 4,988,255, Cl. 414-412.000.
Uponor N.V., Emmaplein: *See—*
Jarvenkyla, Jyri, 4,988,466, Cl. 264-40.100.
Urban, Ernst-Gunther, to Jagenberg Aktiengesellshaft. Device for winding longitudinally separated webs and method of changing finished reels and empty cores. 4,988,052, Cl. 242-56.400.
Urbanneck, Bernd: *See—*
Fuhr, Karl; Muller, Friedemann; Ott, Karl-Heinz; Block, Hans-Dieter; Urbanneck, Bernd; and Ballas, Werner, 4,988,748, Cl. 524-141.000.
Ushijima, Ryosuke: *See—*
Nakagawa, Susumu; Mitomo, Ryuji; and Ushijima, Ryosuke, 4,988,687, Cl. 514-206.000.
Ushikubo, Hisao; Tsuda, Toru; and Takahashi, Ichiro, to Bridgestone Corporation. Pneumatic tires including spirally wound auxiliary layer outside belt. 4,987,938, Cl. 152-528.000.
Ushirogouchi, Toru; Hayase, Shuji; Onishi, Yasunobu; and Horiguchi, Rumiko, to Kabushiki Kaisha Toshiba. Photosensitive resin composition with o-quinone diazide and novolac resins prepared from mixed phenolic reactants to include 3,5-xylenol and 2,5-xylenol. 4,988,601, Cl. 430-192.000.
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Usui, Masayoshi; and Serizawa, Haruo, 4,988,483, Cl. 422-180.000.
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Usui, Yoshiko, to Canon Kabushiki Kaisha. Solid-state imaging device with pixels having weighted sensitivity distribution. 4,989,060, Cl. 357-30.000.

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Zevin, Thomas M.; and Utley, Roy A., 4,989,110, Cl. 360-107.000.

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Toyoda, Hideyoshi; and Utsumi, Ryutaro, 4,988,586, Cl. 424-93.000.

Vadher, Dinesh L. Retractable needle/syringe devices for blood collection, catheterization, and medicinal injection procedures. 4,988,339, Cl. 604-197.000.

Valbusa, Luigi; Coraluppi, Enzo; Quaglia, Andrea; and Tavella, Mario, to Minnesota Mining and Manufacturing Company. 5-(1,2,4)-triazolyl-S-triazines. 4,988,811, Cl. 544-207.000.

Valdivia, Percy: *See—*
Micheels, Ronald H.; Valdivia, Percy; and Hanoka, Jack I., 4,989,059, Cl. 357-30.000.

Valeo: *See—*
Casse, Pierre; and Bochot, Jean-Claude, 4,987,981, Cl. 192-3.290.

Valleylab, Inc.: *See—*
Hornlein, Robert W.; Logan, Joseph N.; Broadwin, Alan; and Podany, Vaclav O., 4,988,334, Cl. 604-22.000.

Valmet-Ahlstrom Inc.: *See—*
Evalahti, Osmo, 4,988,408, Cl. 162-301.000.

Van Allen, Kent E., to Emhart Inc. Stud welding system. 4,988,842, Cl. 219-98.000.

Van Alphen, Willem: *See—*
Vrijssen, Gerardus A. H. M.; and Van Alphen, Willem, 4,988,928, Cl. 315-382.000.

Van Alphen, Willem M.: *See—*
Spanjer, Tjerk G.; Vrijssen, Gerardus A. H. M.; and Van Alphen, Willem M., 4,988,929, Cl. 315-382.000.

van Bavel, Nicholas R.: *See—*
McCaslin, Shawn R.; Williams, Tim A.; and van Bavel, Nicholas R., 4,989,169, Cl. 364-724.090.

Van Cott, Elizabeth M.; and Wilson, Geoffrey G., to New England Biolabs, Inc. Method for producing the FnuDI restriction endonuclease and methylase. 4,988,620, Cl. 435-199.000.

van de Brand, Anton M., to Mali-Ploeger B.V. Device for picking pulse crops. 4,987,730, Cl. 56-16.400.

Van Der Puy, Michael: *See—*
Magid, Hillel; Eibeck, Richard E.; Van Der Puy, Michael; Hollister, Richard M.; and Lavery, Dennis M., 4,988,455, Cl. 252-171.000.

Vanderzanden, John. Poultry feeder. 4,987,859, Cl. 119-57.700.

Van Dijk, Christiaan; and Fraley, Lowell D. Flexible integration of the production of ammonia and urea. 4,988,491, Cl. 423-359.000.

Van Dongen, Cornelis J.; and Ter Horst, Gerrit H. F., to Thomassen & Drijver-Verblifa N.V. Method for activating a metal surface. 4,988,536, Cl. 427-39.000.

Van Hemert, Jan P., to U.S. Philips Corporation. Method and system for determining the variation of a speech parameter, for example the pitch, in a speech signal. 4,989,247, Cl. 381-41.000.

Vanmaele, Luc J.: *See—*
Kok, Piet; Vanmaele, Luc J.; and Tavernier, Serge M., 4,988,600, Cl. 430-110.000.

Van Order, Kim L., to Prince Corporation. Visor with an electrically controlled vanity mirror cover. 4,988,140, Cl. 296-97.200.

Van Riet, Joannes A., to General Motors Corporation. Valve for mold cavity gas removal system. 4,987,946, Cl. 164-305.000.

VanZwienen, William H., to Associated Universities, Inc. Support means for a particle beam position monitor. 4,988,878, Cl. 250-397.000.

Vargai, Zoltan: *See—*
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Varghese, Alexander P.; and Herring, Robert H., to Air Products and Chemicals, Inc. Method and apparatus for storing cryogenic fluids. 4,988,014, Cl. 220-469.000.

Varian Associates, Inc.: *See—*
Tanabe, Eiji; Bayer, Matthew; and Trail, Mark E., 4,988,919, Cl. 315-5.410.

Varian, Raymond H.: *See—*
Smart, Charles F.; Varian, Raymond H.; and D'Aquila, Anthony, 4,988,028, Cl. 227-3.000.

Vater, Wulf: *See—*
Wehinger, Egbert; Meyer, Horst; Bosseret, Friedrich; Vater, Wulf; Towart, Robertson; Stoepel, Kurt; and Kazda, Stanislav, 4,988,717, Cl. 514-356.000.

Vaughan, Edward A.: *See—*
Hollinger, Raymond D.; Dawson, James M.; and Vaughan, Edward A., 4,988,070, Cl. 248-613.000.

VEG-Gasinstituut N.V.: *See—*
Lagas, Jan A.; Borsboom, Johannes; Berben, Pieter H.; and Geus, John W., 4,988,494, Cl. 423-574.00R.

Vega Automation: *See—*
Boisseau, Jean-Louis, 4,988,331, Cl. 493-171.000.

Ventura, Francis P., to T W Kutter Inc. Form, fill, and seal apparatus. 4,987,728, Cl. 53-559.000.

Verburg, Charles C.: *See—*
Schepers, Frederik J.; and Verburg, Charles C., 4,988,462, Cl. 252-174.220.

Vermette Machine Company, Inc.: *See—*
Daugherty, Andrew H., 4,987,976, Cl. 187-11.000.

Vevert, Jean P.: *See—*
Gourvest, Jean-Francois; Lesuisse, Dominique; Philibert, Daniel; and Vevert, Jean P., 4,988,684, Cl. 514-177.000.

Viazanko, John P. Apparatus for installation of a power saw and fence in a table. 4,987,813, Cl. 83-471.300.

Vickers, Incorporated: *See—*
Taplin, Lael B.; and Sagady, Calman S., 4,987,823, Cl. 91-361.000.

Victoria University of Manchester, The: *See—*
Gurd, John R.; and Kawakami, Katsura, 4,989,136, Cl. 364-200.000.

Vidwans, Mohan P.; Parkinson, Susan H.; Scott, Glenn; and Fecteau, Anthony J., to Hoover Universal, Inc. Inertia latching mechanism with floating striker bar. 4,988,134, Cl. 292-198.000.

Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; Leclere, Jean; and Romand, Paul, to Union Financiere pour le Developpement de l'Economie• Cerealiere Unigrains; and Union Financiere Pour le Developpement de L'Economie• Cerealiere Unigrains. System for cutting meat from bone. 4,987,642, Cl. 452-136.000.

Virag, Sandor: *See—*
Korbonits, Dezso; Kiss, Pal; Szekeres, Laszlo; Papp, Gyula; Kovacs, Gabor; Santane Csutor, Andrea; Virag, Sandor; Udvari, Eva; Bata, Imre; Marmarosi nee Kellner, Katalin; Tardos, Laszlo; Kormoczy, Peter; Gergely, Vera; and Vargai, Zoltan, 4,988,730, Cl. 514-466.000.

Viranyi, Ferenc: *See—*
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Virginia Tech Intellectual Properties, Inc.: *See—*
Riffle, Judy S.; and Sinai-Zingde, Gurudus D., 4,988,772, Cl. 525-328.900.

Viskase Corporation: *See—*
Lustig, Stanley; and Schuetz, Jeffrey, 4,988,465, Cl. 264-22.000.

Vives, Van C., to Phillips Petroleum Company. Inhibition of poly(arylene sulfide) resin induced metal corrosion. 4,988,756, Cl. 524-405.000.

VLSI Technology, Inc.: *See—*
Tsou, Morris H., 4,988,643, Cl. 437-200.000.

Voege, Herbert: *See—*
Andrews, Peter; and Voege, Herbert, 4,988,696, Cl. 514-250.000.

Vogt, Daniel S.: *See—*
Ciokajlo, John J.; and Vogt, Daniel S., 4,987,736, Cl. 60-39.310.

Vokac, Peter R.: *See—*
Gerdes, Richard C.; and Vokac, Peter R., 4,989,219, Cl. 375-17.000.

Volke, Hans W.: *See—*
Hilkenmeier, Jurgen; and Volke, Hans W., 4,988,223, Cl. 400-124.000.

von Bormann, Georg. Process, plant and/or apparatus for treating oil-contaminated debris or like materials. 4,988,391, Cl. 134-25.500.

von Gehlen, Walter, to Trutzschler GmbH & Co. KG. Securing a flat head to a travelling flat chain bar using coupling pin and circlip means in a textile carding machine. 4,987,647, Cl. 19-111.000.

von Kaler, Roland L.; and Gremminger, William A., to Tecumseh Products Company. Internal reservoir-defining body for permitting oil expansion within a hydrostatic transmission housing. 4,987,796, Cl. 74-606.00R.

Vosberg, Curtis W.: *See—*
Kaczmarski, Wally L.; Watts, Verne W.; Loraas, Orlan J.; Vosberg, Curtis W.; and Mather, Joseph M., 4,987,689, Cl. 37-195.000.

Voto, Leonard M., Jr.; and Wilson, Shari J., to Minnesota Mining and Manufacturing Company. Security deposit bag. 4,988,547, Cl. 428-35.200.

VPL Research, Inc.: *See—*
Zimmerman, Thomas G.; and Lanier, Jaron Z., 4,988,981, Cl. 340-709.000.

Vriens, Leendert; and Smits, Maurits R. T., to U.S. Philips Corporation. Device for inspecting an interference filter for a projection television display tube. 4,988,203, Cl. 356-402.000.

Vriens, Leendert: *See—*
Doyle, Terence; Vriens, Leendert; and Lammers, Matheus J. G., 4,989,092, Cl. 358-140.000.

Vriesema, Bindert K., to Stamicarbon B. V. Polymer composition on the basis of polymer and a polyester amide. 4,988,776, Cl. 525-425.000.

Vrijssen, Gerardus A. H. M.; and Van Alphen, Willem, to U.S. Philips Corporation. Picture display device. 4,988,928, Cl. 315-382.000.

Vrijssen, Gerardus A. H. M.: *See—*
Spanjer, Tjerk G.; Vrijssen, Gerardus A. H. M.; and Van Alphen, Willem M., 4,988,929, Cl. 315-382.000.

Vrinten, Marinus L. A.: *See—*
Sluyterman, Albertus A. S.; and Vrinten, Marinus L. A., 4,988,926, Cl. 315-368.000.

Vroonland, Evart J., to LTV Energy Products. Loading arm with a lock-down device. 4,987,925, Cl. 137-615.000.

W. H Dunn & Son Limited: *See—*
Kirtland, Dennis A., 4,988,838, Cl. 191-12.00C.

W. L. Gore & Associates, Inc.: *See—*
Lai, Vu A., 4,988,833, Cl. 174-69.000.
Shah, Dinesh T., 4,988,835, Cl. 174-117.00F.

W. R. Grace & Co.-Conn.: *See—*
Holdsworth, Robert S.; Brown, Shawn E.; and Gribens, Joel A., 4,988,467, Cl. 264-46.600.

Overton, Jerry D., 4,988,520, Cl. 426-74.000.

Wacker-Chemis GmbH: *See*—
Demlehner, Ulrich; Beubzer, Bernward; and Wolfgruber, Matthias, 4,988,470, Cl. 264-137.000.

Wacom Co., Ltd.: *See*—
Murakami, Azuma; Yamanami, Tsuguya; Funahashi, Takahiko; Senda, Toshiaki; Aoki, Kazuo; Siguyama, Keiichi; Miyamori, Nobuyuki; Kikuchi, Akio; and Abe, Manabu, 4,988,837, Cl. 178-18.000.

Wada, Masahiro; and Takishima, Yasuhiro, to Kokusai Denshin Denwa Co., Ltd. Error correction system used in picture transmission. 4,989,088, Cl. 358-136.000.

Wada, Masashi: *See*—
Matsuo, Akinori; Watanabe, Masashi; Fujimoto, Michio; Wada, Masashi; and Nagayama, Yoshiharu, 4,989,185, Cl. 365-230.020.

Wada, Tomohisa: *See*—
Hirose, Toshihiko; and Wada, Tomohisa, 4,988,888, Cl. 307-443.000.

Wada, Yukihiro: *See*—
Nakaya, Tsunemoto; Karasawa, Taizo; Kihara, Nobuyuki; Wada, Yukihiro; and Kiyota, Masao, 4,988,529, Cl. 426-569.000.

Wadsworth, Harry J.: *See*—
Hadley, Michael S.; Orlek, Barry S.; Wyman, Paul A.; and Wadsworth, Harry J., 4,988,706, Cl. 514-299.000.

Wagner, Alois; and Friedberger, Otmar, to Messerschmitt-Bolkow-Blohm GmbH. Spring element for connecting two components with angle of rotation mobility. 4,988,084, Cl. 267-160.000.

Wagner, Heinz: *See*—
Fischer, Ulrich; Goeltenboth, Frank; Kurze, Hans-Juergen; and Wagner, Heinz, 4,988,002, Cl. 206-449.000.

Wagner, Klaus; and Hanssler, Gerd, to Bayer Aktiengesellschaft. 3,7-disubstituted benzothiazolones and fungicidal use thereof. 4,988,719, Cl. 514-369.000.

Wagner, Rainer: *See*—
Beck, Fritz; Krohn, Holger; Wagner, Rainer; and Nann, Eberhard, 4,988,418, Cl. 204-153.100.

Wagner, Steven D., to Ampex Corporation. System for compensating timing errors during sampling of signals. 4,989,073, Cl. 358-19.000.

Wahl, Georges: *See*—
Mailliet, Pierre; Lonardi, Emile; Wahl, Georges; and Hoelpes, Gustave, 4,987,838, Cl. 110-182.500.

Wahlco, Inc.: *See*—
Krigmont, Henry V.; and Coe, Everett L., Jr., 4,987,839, Cl. 110-216.000.

Wakayama, Shigeru: *See*—
Yasuda, Satoshi; Wakayama, Shigeru; Tsukumo, Yoshiaki; Haraguchi, Takashi; and Egusa, Syun, 4,987,851, Cl. 118-403.000.

Wakiyama, Yoshihiro; and Ohnishi, Yoshiro, to Horiba, Ltd. Method of analog/digital conversion. 4,989,005, Cl. 341-166.000.

Wakodo Co., Ltd.: *See*—
Obata, Koichi; and Noriuchi, Yoshihiko, 4,988,524, Cl. 426-281.000.

Walach, Eugeniusz: *See*—
Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz, 4,989,000, Cl. 341-107.000.

Walker, Charles W., Jr., to United States of America, Army. Miniature porous electrode and method of making. 4,988,588, Cl. 429-209.000.

Walker, Nigel G., to British Telecommunications public limited company. Optical signal control method and apparatus. 4,988,169, Cl. 350-371.000.

Wallart, Frank: *See*—
Bonneau, Martine; Boudon, Gerard; Le Garrec, Jean-Claude; Mollier, Pierre; and Wallart, Frank, 4,988,893, Cl. 307-279.000.

Walsh, Robert: *See*—
Dunphy, Robert H., Jr.; Walsh, Robert; and Bowers, John H., 4,989,205, Cl. 371-10.100.
Dunphy, Robert H., Jr.; Walsh, Robert; and Bowers, John H., 4,989,206, Cl. 371-10.100.

Walter Kidde Aerospace, Inc.: *See*—
Dunbar, Robert A.; and McClelland, John M., 4,988,884, Cl. 250-554.000.

Walter, Timothy H.; and Pontiff, Thomas M., to Du Pont de Nemours, E. I., and Company. Low density foamed thermoplastic elastomers. 4,988,740, Cl. 521-138.000.

Walz, Klaus; and Breyer, Karl-Heinz, to Bayer Aktiengesellschaft. Foam suppressants. 4,988,463, Cl. 252-358.000.

Wan, Shyue-Yun; Peng, Shie-Ming; and Wu, Der-Chwan, to Industrial Technology Research Institute, R.O.C. Adaptive differential, pulse code modulation sound generator. 4,989,246, Cl. 381-40.000.

Wandel, Martin: *See*—
Meyer, Rolf-Volker; Fahnler, Friedrich; Muller, Hanns-Peter; Wandel, Martin; and Heinz, Hans-Detlef, 4,988,549, Cl. 428-35.700.

Wardle, Robert B.; and Hinshaw, Jerald C., to Thiokol Corporation. Cationic polymerization of cyclic ethers. 4,988,797, Cl. 528-408.000.

Warner-Lambert Company: *See*—
Caprathe, Bradley W.; Jaen, Juan C.; and Wise, Lawrence D., 4,988,699, Cl. 514-254.000.
Kester, Jeffrey A.; Moos, Walter H.; and Thomas, Anthony J., 4,988,688, Cl. 514-212.000.
Kostlan, Catherine R.; and Sircar, Jagadish C., 4,988,702, Cl. 514-258.000.

Warner, Nicholas M.; and Rose, Andrew M., to Unisys Corp. Adjustment of position slope for disk drive servo using half-track point. 4,989,103, Cl. 360-67.000.

Warren, Beth Z., to Monsanto Company. Food preservative compositions. 4,988,522, Cl. 426-268.000.

Warrior, Jogesh, to Rosemount Inc. Dual master implied token communication system. 4,988,990, Cl. 340-25.500.

Wasco Products, Inc.: *See*—
Sampson, Robert; and Flanigan, Sean, 4,987,705, Cl. 52-72.000.

Washington University: *See*—
Olney, John W., 4,988,710, Cl. 514-318.000.

Wason, Satish K., to J. M. Huber Corporation. Paper coated with synthetic alkali metal aluminosilicates. 4,988,561, Cl. 428-331.000.

Wason, Satish K., to J. M. Huber Corporation. Synthetic alkali metal aluminosilicates and use in rubber. 4,988,757, Cl. 524-447.000.

Watanabe, I.: *See*—
Shiotani, Tadahiko; and Watanabe, I., 4,988,104, Cl. 273-167.00H.

Watanabe, Itaru: *See*—
Ueno, Yasuhiro; Kagechika, Hiroshi; Watanabe, Itaru; Kosuge, Shigeyoshi; and Kojima, Toshifumi, 4,988,035, Cl. 228-175.000.

Watanabe, Kiyoshi: *See*—
Kakutani, Tetsu; Yamashita, Kenji; Ikenaka, yasuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,988,624, Cl. 435-320.100.

Watanabe, Masao; and Asami, Ken, to Toyota Jidosha Kabushiki Kaisha. Apparatus for calculating vehicle-wheel revolution values. 4,989,165, Cl. 364-565.000.

Watanabe, Masashi: *See*—
Matsuo, Akinori; Watanabe, Masashi; Fujimoto, Michio; Wada, Masashi; and Nagayama, Yoshiharu, 4,989,185, Cl. 365-230.020.

Watanabe, Mitsuaki; and Nakane, Masayoshi, to NGK Insulators, Ltd. Method of inspecting die for forming honeycomb structure. 4,988,887, Cl. 250-572.000.

Watanabe, Shuuji: *See*—
Nishioka, Goro; Watanabe, Shuuji; and Sakabe, Yukio, 4,988,468, Cl. 264-65.000.

Watanabe, Tadashi: *See*—
Shibayama, Tooru; Watanabe, Tadashi; and Takahashi, Mitsuharu, 4,988,221, Cl. 400-61.000.

Watanabe, Yoshitane; Suzuki, Keitaro; Suzuki, Mutsuko; and Okumura, Eiji, to Nissan Chemical Industries, Ltd. Deodorizer. 4,988,505, Cl. 424-76.300.

Watkins, Albert W.; and Watkins, Ivan W. Evacuated solar collector tube. 4,987,883, Cl. 126-443.000.

Watkins, David S.; Dircks, Kenneth W.; and Epp, Danny G., to Her Majesty the Queen as represented by the Minister of National Defence of Her Majesty's Canadian Government. Novel fuel cell fluid flow field plate. 4,988,583, Cl. 429-30.000.

Watkins, Ivan W.: *See*—
Watkins, Albert W.; and Watkins, Ivan W., 4,987,883, Cl. 126-443.000.

Watson, Martin J.; and Levendusky, Thomas L., to Aluminum Company of America. Process for making a three-piece container involving stretch-blow molding, severing and attaching an end panel to the open bottom. 4,988,399, Cl. 156-73.500.

Watts, Alfred C.: *See*—
Andreas, Ronald D.; Heck, G. Michael; Kohler, Stewart M.; and Watts, Alfred C., 4,987,684, Cl. 33-304.000.

Watts, Verne W.: *See*—
Kaczmarski, Wally L.; Watts, Verne W.; Loraas, Orlan J.; Vosberg, Curtis W.; and Mather, Joseph M., 4,987,689, Cl. 37-195.000.

Wayne Kuna & Associates: *See*—
Kuna, Wayne A.; and Kulesza, Ralph J., 4,988,099, Cl. 273-1.0GF.

Wear, John T.: *See*—
Pitt, Alan R.; Wear, John T.; Richardson, Rachel; and Young, David, 4,988,610, Cl. 430-449.000.

Weaver, Edgar N., Jr.: *See*—
Perry, Ralph; and Weaver, Edgar N., Jr., 4,988,105, Cl. 273-176.00A.

Webb, Graham; and Kirk, Richard A., to Crosfield Electronics Limited. Producing half-tone images of higher resolution through interpolation of original data. 4,989,096, Cl. 358-298.000.

Webb, R. Michael, to U-Fuel, Inc. Portable fueling facility. 4,988,020, Cl. 222-608.000.

Weber, Helmut; and Evans, Steven, to Eastman Kodak Company. Arylazoaniline blue dyes for color filter array element. 4,988,665, Cl. 503-227.000.

Weber, Robert D. Metal collection vessel. 4,988,024, Cl. 224-226.000.

Weber, Robert J.: *See*—
Thompson, Philip H.; Burns, Stanley G.; and Weber, Robert J., 4,988,957, Cl. 331-107.00A.

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Yamamoto, Hiroshi; Fujita, Tsutomu; Kakiuchi, Takao; Yano, Kousaku; Tanimura, Shuichi; and Fujii, Shinji, to Matsushita Electric Industrial Co., Ltd. Method for fabricating interconnection structure. 4,988,423, Cl. 204-192.170.
Yamamoto, Masao, to Mitsubishi Kasei Corporation; and Scalar Corporation. Image pickup head for image pickup device. 4,988,158, Cl. 350-96.180.
Yamamoto, Mutsuhiro: *See*—
Tanaka, Toshiyuki; Nakamura, Nobuo; and Yamamoto, Mutsuhiro, 4,989,162, Cl. 364-513.000.
Yamamoto, Takashi, to Photo Film Co., Ltd. Photographic printer with monitor. 4,989,077, Cl. 358-76.000.
Yamamoto, Tetsuya; Moriya, Takashi; and Tai, Yoshimasa, to Citizen Watch Co., Ltd. Double print head. 4,988,222, Cl. 400-124.000.
Yamamoto, Tohru. Perfume compositions produced by sol-gel methods. 4,988,744, Cl. 523-102.000.
Yamamoto, Tutomu: *See*—
Kumasaka, Sadao; Tada, Satomi; Katsuki, Koretoshi; Fujii, Osamu; Yamamoto, Tutomu; Nagamine, Ryoji; Hashimoto, Kazuo; Idei, Masao; Sato, Yosuke; and Ibata, Kazuo, 4,988,271, Cl. 425-73.000.
Yamamoto, Yoshio; and Nagasawa, Isao, to Murata Kikai Kabushiki Kaisha. Apparatus for supplying packages to a warper creel. 4,988,252, Cl. 414-331.000.
Yamana, Tohru; and Kikuchi, Toshiaki, to Murakami Kameido Co., Ltd. Remote control mechanism. 4,988,068, Cl. 248-484.000.
Yamanaka, Masao, to Sumitomo Heavy Industries, Ltd. Bucket elevator type continuous ship unloader. 4,988,250, Cl. 414-141.100.
Yamanami, Tsuguya: *See*—
Murakami, Azuma; Yamanami, Tsuguya; Funahashi, Takahiko; Senda, Toshiaki; Aoki, Kazuo; Siguyama, Keiichi; Miyamori, Nobuyuki; Kikuchi, Akio; and Abe, Manabu, 4,988,837, Cl. 178-18.000.
Yamane, Daiji: *See*—
Kojima, Kunio; Yamane, Daiji; and Sakamoto, Noriaki, 4,989,198, Cl. 369-116.000.
Yamane, Takakazu: *See*—
Tanimoto, Yoshio; Nakahama, Tadamitsu; Yamane, Takakazu; and Masuda, Shunji, 4,988,537, Cl. 427-46.000.
Yamanoue, Masafumi: *See*—
Kotani, Metahira; Matsumoto, Masafumi; Matsumoto, Junichiro; Hayashi, Motohiko; Fujii, Mamoru; Yamanoue, Masafumi; Sakai, Katsuyuki; Mino, Kouichi; Murata, Naomitsu; Inagaki, Hiroya; and Kondo, Mitsunobu, 4,989,237, Cl. 379-100.000.
Yamaoka, Hideyoshi: *See*—
Ishii, Mitsuo; Kurata, Yukio; and Yamaoka, Hideyoshi, 4,988,165, Cl. 350-245.000.
Yamashita, Akio: *See*—
Takahashi, Hiroyasu; and Yamashita, Akio, 4,989,258, Cl. 382-37.000.
Yamashita, Kenji: *See*—
Kakutani, Tetsu; Yamashita, Kenji; Ikenaka, yasuhiro; Kawaharada, Hajime; and Watanabe, Kiyoshi, 4,988,624, Cl. 435-320.100.
Yamashita, Kyoji: *See*—
Ishibashi, Yoriyuki; Hirano, Ryoichi; and Yamashita, Kyoji, 4,988,197, Cl. 356-349.000.
Yamashita, Manabu, to Alpine Electronics Inc. Cassette tape player. 4,989,105, Cl. 360-96.500.
Yamashita, Masato; Enjyouji, Hideo; Kurihara, Hiroshi; Yamaguchi, Shoji; Shimizu, Hideto; Hashizume, Nichio; and Mori, Yasusuke, to Mitsubishi Petrochemical Company Ltd. Method of measuring resistivity, and apparatus therefor. 4,989,154, Cl. 364-482.000.
Yamashita, Miyuki, to Hirakawa Kogyosha Co., Ltd. Process camera. 4,989,033, Cl. 355-43.000.
Yamashita, Seiya; and Sasaki, Haruo, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Floating structure. 4,987,846, Cl. 114-265.000.
Yamashita, Terufumi: *See*—
Minamitani, Kunitomo; Takaba, Tetsuro; Yamashita, Terufumi; and Nishikawa, Toshihide, 4,987,876, Cl. 123-492.000.
Yamashita, Tsutomu T.; Shir, Ching-Cheng; and Chen, Tu, to Komag, Inc. Method for manufacturing a thin film magnetic recording medium. 4,988,578, Cl. 428-678.000.
Yamatsu, Isao; Inai, Yuichi; Abe, Shinya; Suzuki, Takeshi; Suzuki, Yoshikazu; Tagaya, Osamu; Suzuki, Kouichi; Abe, Koichi; and Yamada, Kouji, to Eisai Co., Ltd. 3,7,11,15-tetramethyl-2,4,6,10,14-hexadecapentaenoic acid composition and use for treating papillomata. 4,988,732, Cl. 514-560.000.
Yamauchi, Kazumi: *See*—
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Yamaura, Yutaka: *See*—
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Yamazaki, Michihito: *See*—
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Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method for forming FET with a super lattice channel. 4,988,634, Cl. 437-41.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Semiconductor device, manufacturing method, and system. 4,988,642, Cl. 437-101.000.
Yang, Ren-der: *See*—
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Yardley, John P.: *See*—
Abou-Gharbia, Magid A.; Yardley, John P.; and Cliffe, Ian A., 4,988,814, Cl. 544-295.000.
Yasuda, Satoshi; Wakayama, Shigeru; Tsukumo, Yoshiaki; Haraguchi, Takashi; and Egusa, Syun, to Kabushiki Kaisha Toshiba. Apparatus for forming organic thin film. 4,987,851, Cl. 118-403.000.
Yasuhara, Toshihiro; Masuda, Masachika; and Murakami, Gen, to Hitachi, Ltd. Semiconductor device and method of manufacturing the same. 4,989,068, Cl. 357-72.000.
Yasunaga, Shinichi: *See*—
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Yasunaga, Tadashi: *See*—
Arai, Yoshihiro; Yasunaga, Tadashi; and Shirahata, Ryuji, 4,988,535, Cl. 427-38.000.
Yatsuda, Yuji: *See*—
Narahara, Mitsumasa; Yamauchi, Kazumi; Yatsuda, Yuji; Yasunaga, Shinichi; Moriguchi, Fujio; and Kato, Nobuhisa, 4,989,224, Cl. 377-39.000.
Yazu, Shuji: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,988,670, Cl. 505-1.000.
Yeh, Ying-Cheun: *See*—
Chi, Guey-Fa; Cheng, Duen-Jen; and Yeh, Ying-Cheun, 4,987,879, Cl. 123-617.000.
Yeramyan, Ara G.: *See*—
Den Hartog, Herman C.; Palmer, George T.; and Yeramyan, Ara G., 4,988,759, Cl. 524-517.000.

Yokoi, Toshio: *See*—
Nishio, Takeyoshi; Yokoi, Toshio; Nomura, Takao; Ueno, Kouhei; Akagawa, Tomohiko; Sakai, Ikunori; and Takasaki, Yasufumi, 4,988,764, Cl. 525-66.000.

Yokoo, Kuniyoshi: *See*—
Ono, Shoichi; Yokoo, Kuniyoshi; and Okamoto, Tadashi, 4,988,956, Cl. 331-86.000.

Yokota, Akira, to Olympus Optical Co., Ltd. Imaging device and endoscope system provided with the same. 4,988,171, Cl. 350-404.000.

Yokoyama, Kenji, to Yamaha Corporation. Acoustic apparatus. 4,989,187, Cl. 367-140.000.

Yokoyama, Naoki: *See*—
Okada, Makoto; and Yokoyama, Naoki, 4,989,052, Cl. 357-22.000.

Yokoyama, Toshio: *See*—
Maekawa, Yoshikazu; Muramatu, Takeshi; Yokoyama, Toshio; and Yukizane, Shigemi, 4,988,085, Cl. 270-53.000.

Yoneda, Takao; Nakano, Hiroshi; and Yonezu, Toshihiro, to Toyoda Koki Kabushiki Kaisha. Synchronous control system and method therefor. 4,988,937, Cl. 318-675.000.

Yoneda, Yasuhiro: *See*—
Fukuyama, Shun-ichi; Yoneda, Yasuhiro; Miyagawa, Masashi; Nishii, Kota; and Matsuura, Azuma, 4,988,514, Cl. 428-447.000.

Yonezu, Toshihiro: *See*—
Yoneda, Takao; Nakano, Hiroshi; and Yonezu, Toshihiro, 4,988,937, Cl. 318-675.000.

Yoo, Hideo: *See*—
Suzuki, Koji; Oyama, Hajime; Namekata, Shinichi; Sawai, Yuji; and Yoo, Hideo, 4,989,043, Cl. 355-246.000.

York, James E., to Universal Instruments Corporation. Advanced digital motion control. 4,988,935, Cl. 318-568.180.

Yoshida, Eizo: *See*—
Sakai, Tomoharu; Yoshida, Eizo; Mihara, Hiroshi; and Adachi, Toshio, 4,987,852, Cl. 118-603.000.

Yoshida, Haruo: *See*—
Kogura, Masahisa; Yoshida, Haruo; and Tanaka, Minoru, 4,987,673, Cl. 29-564.000.

Yoshida, Hidetoshi: *See*—
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,987,710, Cl. 52-167.0DF.
Noji, Toshiyuki; Yoshida, Hidetoshi; Tatsumi, Eiji; Akao, Shinichi; and Kosaka, Hideyuki, 4,987,711, Cl. 52-167.0DF.

Yoshida Kogyo, K.K.: *See*—
Horita, Yoshiyuki, 4,987,658, Cl. 24-403.000.
Kasai, Kazumi, 4,987,661, Cl. 24-625.000.

Yoshida, Koji: *See*—
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Yoshida, Kunio: *See*—
Morimoto, Masafumi; Yoshida, Kunio; and Nakanishi, Tosaku, 4,989,177, Cl. 364-900.000.

Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, to Kyodo Electric Co., Ltd. Apparatus for indicating incomplete and complete fastening of screw components. 4,988,246, Cl. 411-10.000.

Yoshida, Shingo: *See*—
Yamaguchi, Masaaki; Kito, Masashi; Iguchi, Nobuhiro; Yoshida, Shingo; and Ishigure, Atushi, 4,988,300, Cl. 434-247.000.

Yoshida, Takashi: *See*—
Atsumi, Kunio; Iwamatsu, Katsuyoshi; Sakagami, Kenji; Ogino, Hiroko; and Yoshida, Takashi, 4,988,686, Cl. 514-203.000.

Yoshida, Toshiro: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,988,456, Cl. 252-314.000.

Yoshida, Yutaka: *See*—
Naka, Yoji; and Yoshida, Yutaka, 4,989,030, Cl. 354-435.000.

Yoshihara, Akira: *See*—
Matsumura, Koichi; and Yoshihara, Akira, 4,989,025, Cl. 354-106.000.

Yoshii, Noboru, to Mazda Motor Corporation. Seat belt device for open-top vehicle. 4,988,121, Cl. 280-808.000.

Yoshino, Junichi: *See*—
Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, 4,987,732, Cl. 56-255.000.

Yoshio, Junichi; and Suzuki, Masami, to Pioneer Electronic Corporation. Apparatus for reproducing and processing picture information from a recording medium. 4,989,097, Cl. 358-335.000.

Yoshioka, Takaharu: *See*—
Yoshida, Minoru; Arai, Teruo; Ishikawa, Toshiro; Shimada, Masaji; Susaki, Shigeru; Yamada, Yukihiko; Ohta, Hisao; Nagami, Katsuyoshi; Hayajiri, Kazutami; Yoshioka, Takaharu; Hirai, Shigo; Ichida, Tosio; and Ishii, Nobuyuki, 4,988,246, Cl. 411-10.000.

Yoshizawa, Kenji: *See*—
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Yoshizawa, Takashi: *See*—
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Young, Bobby D. Can trowel. 4,987,635, Cl. 15-236.010.

Young, David: *See*—
Pitt, Alan R.; Wear, John T.; Richardson, Rachel; and Young, David, 4,988,610, Cl. 430-449.000.

Young, Harvey J.; and Bernasek, Edward, to R. J. Reynolds Tobacco Company. Tobacco reconstitution process. 4,987,906, Cl. 131-297.000.

Young, Jeffrey M.: *See*—
Weitzman, David H.; and Young, Jeffrey M., 4,988,044, Cl. 241-14.000.

Yu, Ho, to Aluminum Company of America. Method and apparatus for controlling the heat transfer of liquid coolant in continuous casting. 4,987,950, Cl. 164-455.000.

Yuasa, Kimihiro: *See*—
Morita, Kazuharu; Uchida, Shunji; and Yuasa, Kimihiro, 4,988,460, Cl. 252-299.500.

Yuen, Pui-Ho, to Schering Corporation. Parenteral compositions. 4,988,722, Cl. 514-383.000.

Yugami, Jiro: *See*—
Hiraiwa, Atsushi; Iijima, Shinpei; and Yugami, Jiro, 4,989,056, Cl. 357-23.600.

Yuh, Huoy-Jen: *See*—
Spiewak, John W.; Yuh, Huoy-Jen; Thornton, Constance J.; Abramsohn, Dennis A.; Nichol-Landry, Deborah; and Mammino, Joseph, 4,988,597, Cl. 430-62.000.

Yukizane, Shigemi: *See*—
Maekawa, Yoshikazu; Muramatu, Takeshi; Yokoyama, Toshio; and Yukizane, Shigemi, 4,988,085, Cl. 270-53.000.

Zabala, Edilberto M. Grill grate cover. 4,987,880, Cl. 126-25.00R.

Zahn, Christian, to Schuberth-Werk GmbH & Co., KG. Military safety helmet. 4,987,609, Cl. 2-6.000.

Zakharov, Alexandr A.: *See*—
Kiselev, Vasily P.; Klimenko, Nikolai P.; and Zakharov, Alexandr A., 4,987,707, Cl. 52-88.000.

Zaklika, Krzysztof A.: *See*—
Smith, Terrance P.; Zaklika, Krzysztof A.; Jongewaard, Susan K.; and Leichter, Louis M., 4,988,664, Cl. 503-227.000.

Zalusky, James T.: *See*—
Cain, Gary L.; Sobottke, Mark D.; Church, Gerald H.; and Zalusky, James T., 4,988,193, Cl. 356-152.000.

Zama, Yoshiaki: *See*—
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Benelli, Giancarlo; Carenzi, Angelo; Chiarino, Dario; and Fantucci, Mario, 4,988,691, Cl. 514-214.000.

Zanke, Dieter: *See*—
Detre, Tamas; Rejto, Lajos; Sos, Jozsef; Szego, Andras; Viranyi, Ferenc; Ersek, Tibor; Nagy nee Hegyi, Gyongyver; Hornok, Laszlo ; Molnar, Attila; Schuszler, Erzsebet; Angyan, Sandor; Marmarosi, Katalin, nee Kellner; Horst, Lyr; Zanke, Dieter; Lenner, Brita; Strump, Marlies; and Oros, Gyula, 4,988,693, Cl. 514-231.200.

Zapf, Jurgen: *See*—
Froesch, Ernst R.; Guler, Hans-Peter; Schmid, Christoph; and Zapf, Jurgen, 4,988,675, Cl. 514-4.000.

Zare, Richard N.; Engelke, Friedrich; and Hahn, Jong H., to Leland Stanford Junior College, The Board of Trustees of the. Apparatus and method for laser desorption of molecules for quantitation. 4,988,879, Cl. 250-423.00P.

Zawada, Jerome J.: *See*—
Miller, Alan L.; Studtmann, George H.; King, Todd L.; Gallaher, Kenneth R.; Zawada, Jerome J.; and Umlauf, William P., 4,988,967, Cl. 335-279.000.

Zeets, Joseph S.: *See*—
Powers, Richard G.; London, Eugene J.; Alley, Lewis F.; Anderson, James E.; and Zeets, Joseph S., 4,987,643, Cl. 425-139.000.

Zegers, Antonius P. F., to U.S. Philips Corporation. Picture display device. 4,988,915, Cl. 313-479.000.

Zegler, Stephen A., to Collins & Aikman Floor Coverings Corporation. Carpet having nonwoven fleece adhered to secondary backing by embossing and method of making same. 4,988,551, Cl. 428-40.000.

Zeiler, Hans-Joachim: *See*—
Dornhagen, Jurgen; Angerbauer, Rolf; Metzger, Karl G.; and Zeiler, Hans-Joachim, 4,988,685, Cl. 514-202.000.

Zellner, Adolf: *See*—
Rullmann, Helmut; Zellner, Adolf; and Gebhard, Manfred, 4,988,753, Cl. 524-260.000.

Zen, Shinichiro: *See*—
Takemura, Yasuhiko; Zen, Shinichiro; Zama, Yoshiaki; and Enyo, Hiroji, 4,988,548, Cl. 428-368.000.

Zerkowitz, Avinoam, to Hughes Aircraft Company. Digital range correlator. 4,989,009, Cl. 342-145.000.

Zertani, Rudolf: *See*—
Prass, Werner; Zertani, Rudolf; Lingnau, Juergen; and Hanold, Norbert, 4,988,606, Cl. 430-270.000.

Zevin, Thomas M.; and Utley, Roy A., to Datatape Incorporated. Full radius carrier to drum contact in a rotary head scanner. 4,989,110, Cl. 360-107.000.

Zhu, Daniel: *See*—
Huang, George C.; and Zhu, Daniel, 4,988,225, Cl. 400-196.100.

Zimmerman, Thomas G.; and Lanier, Jaron Z., to VPL Research, Inc. Computer data entry and manipulation apparatus and method. 4,988,981, Cl. 340-709.000.

Zipplies, Matthias: *See*—
Lauer, Manfred; Zipplies, Matthias; Sauter, Hubert; Moore, Barbara A.; Carlson, Dale R.; Zorner, Paul S.; Westphalen, Karl-Otto; and Wuerzer, Bruno, 4,988,818, Cl. 548-267.400.

Zirps, Wilhelm, to Robert Bosch GmbH. Hydraulic high-pressure pump for a vehicle brake system. 4,988,147, Cl. 303-116.000.

Zorner, Paul S.: *See*—
Lauer, Manfred; Zipplies, Matthias; Sauter, Hubert; Moore, Barbara A.; Carlson, Dale R.; Zorner, Paul S.; Westphalen, Karl-Otto; and Wuerzer, Bruno, 4,988,818, Cl. 548-267.400.
Zotto, Anthony A.; Thimineur, Raymond J.; and Raleigh, William J., to General Electric Company. Silicone surfactants. 4,988,504, Cl. 424-65.000.
Zuckerman, Ronald K.; and McAfee, Gregory J., to Grist Mill Company. Combination board game and wrapper for edible play pieces. 4,988,110, Cl. 273-286.000.
Zummer, Linda A.; Janke, Donald E.; and Giordano, James R., to Whirlpool Corporation. Canister vacuum cleaner and method of manufacture. 4,987,637, Cl. 15-328.000.
Zwart, Hans. Method of decorative a human breast. 4,987,667, Cl. 29-160.600.
501 Lechler GmbH & Co. KG: *See*—
Lechler, Walter H., 4,988,043, Cl. 239-597.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 29TH DAY OF JANUARY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bard, Martin: *See*—
Cremer, Gottfried; and Bard, Martin, Re. 33,529, Cl. 219-213.000.

Bilco Tools, Inc.: *See*—
Coyle, William E., Sr., Re. 33,526, Cl. 81-470.000.

Buchtal Gesellschaft mit beschrankter Haftung: *See*—
Cremer, Gottfried; and Bard, Martin, Re. 33,529, Cl. 219-213.000.

Coyle, William E., Sr., to Bilco Tools, Inc. Power tongs and control system. Re. 33,526, Cl. 81-470.000.

Cremer, Gottfried; and Bard, Martin, to Buchtal Gesellschaft mit beschrankter Haftung. Covering for wall, ceiling or floor linings. Re. 33,529, Cl. 219-213.000.

Doty, F. David. Microtube-strip heat exchanger. Re. 33,528, Cl. 165-158.000.

Fox, Anthony, to TFC Corporation. Trash compactor. Re. 33,527, Cl. 100-53.000.

TFC Corporation: *See*—
Fox, Anthony, Re. 33,527, Cl. 100-53.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Celanese Corporation: *See*—
Halmess, C. B.; and Deal, Lindsey C., B1 4,725,664, Cl. 528-176.000.

Dalton, Jeffrey L.; and Johnson, Philip M., to Gentex Optics, Inc. Method of forming a tintable abrasion-resistant coating on a substrate and article produced thereby. B1 4,550,059, 1-29-91, Cl. 428-409.000.

Deal, Lindsey C.: *See*—
Halmess, C. B.; and Deal, Lindsey C., B1 4,725,664, Cl. 528-176.000.

Fong, James C., to Tong-Fong Brush Factory Co., Ltd. Anti-electrostatic brush. B1 4,797,966, 1-29-91, Cl. 15-186.000.

Gentex Optics, Inc.: *See*—
Dalton, Jeffrey L.; and Johnson, Philip M., B1 4,550,059, Cl. 428-409.000.

Gurkov, Konstantin S.: *See*—
Sudnishnikov, Boris V.; Kostylve, Alexander D.; Gurkov, Konstantin S.; Tupitsin, Konstantin K.; Klimashko, Vladimir V.; Solomko, Viktor E.; Reinsburg, Alexandr N.; and Yampolsky, Moisei L., B1 3,756,328, Cl. 173-91.000.

Halmess, C. B.; and Deal, Lindsey C., to Celanese Corporation. Impact modified polyester. B1 4,725,664, 1-29-91, Cl. 528-176.000.

Institut Gorngo Dela Siberskogo: *See*—
Sudnishnikov, Boris V.; Kostylve, Alexander D.; Gurkov, Konstantin S.; Tupitsin, Konstantin K.; Klimashko, Vladimir V.; Solomko, Viktor E.; Reinsburg, Alexandr N.; and Yampolsky, Moisei L., B1 3,756,328, Cl. 173-91.000.

Johnson, Philip M.: *See*—
Dalton, Jeffrey L.; and Johnson, Philip M., B1 4,550,059, Cl. 428-409.000.

Julius Blum, Inc.: *See*—
Rock, Erich; and Mages, Bernhard, B1 4,045,841, Cl. 16-238.000.

Klimashko, Vladimir V.: *See*—
Sudnishnikov, Boris V.; Kostylve, Alexander D.; Gurkov, Konstantin S.; Tupitsin, Konstantin K.; Klimashko, Vladimir V.; Solomko, Viktor E.; Reinsburg, Alexandr N.; and Yampolsky, Moisei L., B1 3,756,328, Cl. 173-91.000.

Kostylve, Alexander D.: *See*—
Sudnishnikov, Boris V.; Kostylve, Alexander D.; Gurkov, Konstantin S.; Tupitsin, Konstantin K.; Klimashko, Vladimir V.; Solomko, Viktor E.; Reinsburg, Alexandr N.; and Yampolsky, Moisei L., B1 3,756,328, Cl. 173-91.000.

Mages, Bernhard: *See*—
Rock, Erich; and Mages, Bernhard, B1 4,045,841, Cl. 16-238.000.

Reinsburg, Alexandr N.: *See*—
Sudnishnikov, Boris V.; Kostylve, Alexander D.; Gurkov, Konstantin S.; Tupitsin, Konstantin K.; Klimashko, Vladimir V.; Solomko, Viktor E.; Reinsburg, Alexandr N.; and Yampolsky, Moisei L., B1 3,756,328, Cl. 173-91.000.

Rock, Erich; and Mages, Bernhard, to Julius Blum, Inc. Hinge. B1 4,045,841, 1-29-91, Cl. 16-238.000.

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Ogawa, Kikuo, 314,179, Cl. D13-147.000.
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CLASSIFICATION OF PATENTS

ISSUED JANUARY 29, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

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515 4,987,618
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367 4,988,078

CLASS 252

8.514 4,988,450
8.8 4,988,449
95 4,988,451
99 4,988,452
122 4,988,453
140 4,988,454
171 4,988,455
174.22 4,988,462
182.18 4,988,461
299.5 4,988,460
299.61 4,988,459
299.63 4,988,458
314 4,988,456
358 4,988,463

CLASS 264

12 4,988,464
22 4,988,465
40.1 4,988,466
46.6 4,988,467
65 4,988,468
113 4,988,469
137 4,988,470
211.12 4,988,471
273 4,988,472
518 4,988,478
537 4,988,477

CLASS 266

156 4,988,079

CLASS 267

30 4,988,080
64.15 4,988,081
64.240 4,988,082
140 4,988,083
160 4,988,084

CLASS 270

53 4,988,085
55 4,988,086

CLASS 271

186 4,988,088
314 4,988,087

CLASS 272

29 4,988,089
56.5 R 4,988,090
67 4,988,091
70 4,988,092
94 4,988,093
116 4,988,094
118 4,988,095
4,988,096
119 4,988,097
134 4,988,098

CLASS 273

1 GF 4,988,099
73 C 4,988,100
73 D 4,988,101
81 A 4,988,102
157 R 4,988,103
167 H 4,988,104
176 A 4,988,105
176 F 4,988,106
183 D 4,988,107
4,988,108
281 4,988,109
286 4,988,110
310 4,988,111
420 4,988,112

CLASS 277

212 FB 4,988,113

CLASS 280

304.1 4,988,114
404 4,988,115
477 4,988,116
646 4,988,117
743 4,988,118
4,988,119
755 4,988,120
808 4,988,121
841 4,988,122

CLASS 281

15.1 4,988,123

CLASS 283

56 4,988,124
67 4,988,125
92 4,988,126

CLASS 285

94 4,988,127
149 4,988,128
328 4,988,129
4,988,130

CLASS 292

34 4,988,131
144 4,988,132
191 4,988,133
198 4,988,134
201 4,988,135
336.3 4,988,136

CLASS 293

109 4,988,137
127 4,988,138

CLASS 296

97.2 4,988,139
4,988,140
102 4,988,141
146 4,988,142
177 4,988,143
192 4,988,144

CLASS 297

301 4,988,145

CLASS 300

21 4,988,146

CLASS 303

116 4,988,147
4,988,148

CLASS 307

66 4,988,889
147 4,988,890
201 4,988,891
269 4,988,892
279 4,988,893
296.1 4,988,894
359 4,988,895
443 4,988,888
452 4,988,896
475 4,988,897
4,988,898
4,988,899
494 4,988,900
518 4,988,901
572 4,988,902

CLASS 310

12 4,988,903
4,988,904
68 B 4,988,905
90.5 4,988,906
181 4,988,907
331 4,988,908
358 4,988,909

CLASS 312

223 4,988,149
256 4,988,150

CLASS 313

35 4,988,910
113 4,988,911
318 4,988,912
422 4,988,913
479 4,988,915
486 4,988,914
623 4,988,916
631 4,988,917
641 4,988,918

CLASS 315

5.410 4,988,919
101 4,988,920
159 4,988,921
223 4,988,922
227 R 4,988,923
291 4,988,924
334 4,988,925
368 4,988,926
371 4,988,927
382 4,988,928
4,988,929

CLASS 318

82 4,988,930
293 4,988,931
560 4,988,932
561 4,988,933
568.15 4,988,934
568.18 4,988,935
632 4,988,936
675 4,988,937
696 4,988,938
800 4,988,939
4,988,940

CLASS 322

28 4,988,941

CLASS 323

282 4,988,942

CLASS 324

140 D 4,988,943
154 PB 4,988,944
175 4,988,945
204 4,988,946
307 4,988,947
444 4,988,948
541 4,988,949

CLASS 328

235 4,988,950

CLASS 329

345 4,988,951

CLASS 330

51 4,988,952
261 4,988,953
264 4,988,954

CLASS 331

11 4,988,955
86 4,988,956
107 A 4,988,957
111 4,988,958
117 D 4,988,959

CLASS 332

127 4,988,960

CLASS 333

26 4,988,961
28 R 4,988,962
261 4,988,963

CLASS 335

131 4,988,964
205 4,988,965
273 4,988,966
279 4,988,967

CLASS 336

98 4,988,968

CLASS 337

260 4,988,969

CLASS 338

32 S 4,988,971
34 4,988,970

CLASS 340

25.5 4,988,990
310 A 4,988,972
396 BI 4,183,018
425.5 4,988,973
431 4,988,974
450.3 4,988,975
461 4,988,976
524 4,988,977
624 4,988,978
683 4,988,979
692 4,988,980
706 4,988,982
709 4,988,981
712 4,988,983
728 4,988,984
750 4,988,985
815.01 4,988,986
825.06 4,988,988
825.21 4,988,989
825.31 4,988,987
825.5 4,988,991
825.69 4,988,992
825.8 4,989,022
825.800 4,988,993
936 4,988,994
971 4,988,995
984 4,988,996

CLASS 341

25 4,988,997
55 4,988,998
59 4,988,999
107 4,989,000
116 4,989,001
120 4,989,002
136 4,989,003
161 4,989,004
166 4,989,005

CLASS 342

1 4,989,006
11 4,989,007
25 4,989,008
145 4,989,009
150 4,989,010
373 4,989,011

CLASS 343

702 4,989,012
721 4,989,013
742 4,989,014
915 4,989,015

CLASS 346

1.1 4,989,016
76 PH 4,989,017
4,989,018
108 4,989,019
157 4,989,020
160.1 4,989,021

CLASS 350

3.66 4,988,151
3.7 4,988,152
3.8 4,988,153
3.86 4,988,154
96.1 4,988,155
96.12 4,988,156
96.13 4,988,157
96.18 4,988,158
96.20 4,988,159
4,988,160
4,988,161
96.25 4,988,162
96.29 4,988,163
165 4,988,164
245 4,988,165
321 4,988,166
337 4,988,167
339 F 4,988,168

371 4,988,169
377 4,988,170
404 4,988,171
413 4,988,172
423 4,988,173
427 4,988,174
469 4,988,175
470 4,988,176
501 4,988,177
631 4,988,178
637 4,988,179
641 4,988,180

CLASS 351

52 4,988,181
169 4,988,182
210 4,988,183
221 4,988,184
233 4,988,185
239 4,988,186

CLASS 353

101 4,988,187
122 4,988,188

CLASS 354

62 4,989,023
76 4,989,024
106 4,989,025
150 4,989,026
253 4,989,027
324 4,989,028
418 4,989,029
435 4,989,030

CLASS 355

30 4,989,031
38 4,989,032
43 4,989,033
52 4,989,034
93 4,989,035
106 4,989,036
200 4,989,037
202 4,989,038
208 4,989,039
218 4,989,040
235 4,989,041
244 4,989,042
246 4,989,043
251 4,989,044
260 4,989,045
279 4,989,046
297 4,989,047
299 4,989,048
326 4,989,049

CLASS 356

4 4,988,189
28 4,988,190
4,988,191
138 4,988,192
152 4,988,193
243 4,988,194
244 4,988,195
308 4,988,196
349 4,988,197
357 4,988,198
368 4,988,199
376 4,988,200
4,988,201
394 4,988,202
402 4,988,203
430 4,988,204
446 4,988,205
4,988,206

CLASS 357

17 4,989,050
19 4,989,051
22 4,989,052
23.5 4,989,053
4,989,054
23.6 4,989,055
4,989,056
23.7 4,989,057
23.8 4,989,058
30 4,989,059
4,989,060
41 4,989,061
45 4,989,062
54 4,989,063
67 4,989,064
4,989,065
68 4,989,066
69 4,989,067
72 4,989,068
74 4,989,069
82 4,989,070

CLASS 358

2 4,989,071
10 4,989,072
19 4,989,073
21 R 4,989,074
41 4,989,075
61 4,989,076
76 4,989,077
80 4,989,079
4,989,080
88 4,989,078
93 4,989,081
101 4,989,082
107 4,989,083
108 4,989,084
4,989,085
109 4,989,086
136 4,989,087
4,989,088
4,989,089
140 4,989,090
4,989,091
4,989,092
213.19 4,989,093
4,989,094
4,989,095
298 4,989,096
335 4,989,097
455 4,989,098
474 4,989,099
483 4,989,100

CLASS 360

14.3 4,989,101
27 4,989,102
67 4,989,103
72.1 4,989,104
96.5 4,989,105
99.02 4,989,106
99.08 4,989,107
105 4,989,108
106 4,989,109
107 4,989,110
132 4,989,111
137 4,989,112

CLASS 361

84 4,989,114
126 4,989,115
154 4,989,116
306 4,989,117
376 4,989,118
534 4,989,119

CLASS 362

35 4,989,120
61 4,989,121
97 4,989,122
102 4,989,123
183 4,989,124
346 4,989,125
351 4,989,126

CLASS 363

16 4,989,127
41 4,989,128

CLASS 364

187 4,989,129
200 4,989,113
4,989,130
4,989,131
4,989,132
4,989,133
4,989,134
4,989,135
4,989,136
4,989,137
4,989,138
4,989,139
4,989,140
4,989,141
413.15 4,989,142
413.25 4,989,143
419 4,989,144
4,989,145
424.04 4,989,146
424.05 4,989,148
424.1 4,989,147
426.04 4,989,149
431.03 4,989,150
449 4,989,151
474.24 4,989,152
477 4,989,153
482 4,989,154
483 4,989,155
488 4,989,156
500 4,989,157
508 4,989,158
4,989,159
509 4,989,160
513 4,989,161
4,989,162
519 4,989,163
551.01 4,989,164
565 4,989,165
578 4,989,166
708 4,989,167
715.09 4,989,168
724.09 4,989,169
724.19 4,989,170
737 4,989,172
746.1 4,989,171
764 4,989,173
786 4,989,174
900 4,989,175
4,989,176
4,989,177
4,989,178

CLASS 365

45 4,989,179
189.07 4,989,180
200 4,989,181
208 4,989,184
210 4,989,182
222 4,989,183
230.02 4,989,185

CLASS 366

25 4,988,207
108 4,988,208
285 4,988,303

CLASS 367

97 4,989,186
140 4,989,187

CLASS 368

70 4,989,188

CLASS 369

13 4,989,189
32 4,989,190
33 4,989,191
44.12 4,989,192
44.26 4,989,193
44.27 4,989,194
50 4,989,195
54 4,989,196
77.2 4,989,197
116 4,989,198

CLASS 370

1 4,989,199
3 4,989,200
4,989,201
13 4,989,202
58.2 4,988,209
85.13 4,989,203
94.1 4,989,204

CLASS 371

10.1 4,989,205
4,989,206
16.2 4,989,207
18 4,989,208
22.1 4,989,209
40.1 4,989,210
42 4,989,211

CLASS 372

26 4,989,212
45 4,989,213
50 4,989,214
70 4,989,215
97 4,989,216
107 4,989,217

CLASS 373

145 4,989,218

CLASS 374

5 4,988,210
121 4,988,211
161 4,988,212

CLASS 375

8 4,989,221
17 4,989,219
83 4,989,220

CLASS 376

245 4,988,476
248 4,988,475
261 4,988,474
327 4,988,473

CLASS 377

24.1 4,989,222
39 4,989,223
4,989,224

CLASS 378

10 4,989,225
145 4,989,226
177 4,989,227
196 4,989,228
198 4,989,229

CLASS 379

59 4,989,230
4,989,231
88 4,989,232
92 4,989,233
4,989,234
96 4,989,235
98 4,989,236
100 4,989,237
4,989,238
145 4,989,239
355 4,989,240
357 4,989,241
390 4,989,242
402 4,989,243

CLASS 380

20 4,989,244
23 4,989,245

CLASS 381

40 4,989,246
41 4,989,247
42 4,989,248
43 4,989,249
51 4,989,250
68.2 4,989,251
71 4,989,252
110 4,989,253
202 4,989,254

CLASS 382

8 4,989,255
15 4,989,256
18 4,989,257
37 4,989,258
42 4,989,259

CLASS 383

6 4,988,213
74 4,988,216

CLASS 384

18 4,988,214
44 4,988,215
273 4,988,217
322 4,988,218
448 4,988,219
4,988,220

CLASS 392

363 4,988,847

CLASS 400

61 4,988,221
124 4,988,222
4,988,223
194 4,988,224
196.1 4,988,225
605 4,988,226

CLASS 401

117 4,988,227
289 4,988,228

CLASS 402

4 4,988,229

CLASS 403

170 4,988,230
370 4,988,231
403 4,988,232

CLASS 404

108 4,988,233

CLASS 405

36 4,988,234
50 4,988,235
157 4,988,236
229 4,988,237
263 4,988,238

CLASS 406

99 4,988,239
166 4,988,240

CLASS 407

51 4,988,241
114 4,988,242

CLASS 408

241 R 4,988,243

CLASS 409

132 4,988,244
178 4,988,245

CLASS 411

10 4,988,246
38 4,988,247
348 4,988,248
513 4,988,249

CLASS 414

141.1 4,988,250
196 4,988,264
276 4,988,251
331 4,988,252
397 4,988,253
401 4,988,254
412 4,988,255
416 4,988,256
420 4,988,257
500 4,988,258
729 4,988,259
744.1 4,988,260
749 4,988,261
4,988,262
795.8 4,988,263
796.8 4,988,265

CLASS 415

173.1 4,988,266

CLASS 417

50 4,988,267
312 4,988,268
4,988,269

CLASS 419

8 4,988,479
11 4,988,480

CLASS 422

100 4,988,481
4,988,482
180 4,988,483
186.19 4,988,484
191 4,988,486
292 4,988,485

CLASS 423

21.5 4,988,487
210.5 4,988,488
321 R 4,988,489
351 4,988,490
359 4,988,491
447.4 4,988,492
450 4,988,493
574 R 4,988,494
616 4,988,495

CLASS 424

1.1 4,988,496
7.1 4,988,497
52 4,988,498
4,988,499
53 4,988,500
59 4,988,501
63 4,988,502
4,988,503
65 4,988,504
76.3 4,988,505
81 4,988,506
84 4,988,507
4,988,508
4,988,509
4,988,510
4,988,511
93 4,988,586
422 4,988,512
439 4,988,513
529 4,988,515
659 4,988,516
702 4,988,517

CLASS 425

72.2 4,988,270
73 4,988,271
087 4,988,272
139 4,987,643
145 4,988,273
174.4 4,988,274
186 4,988,275
290 4,988,276
435 4,988,277
466 4,988,278
525 4,988,279
556 4,988,280
559 4,988,281
817 R 4,988,282

CLASS 426

5 4,988,518
63 4,988,519
74 4,988,520
93 4,988,521
268 4,988,522
4,988,523
281 4,988,524
493 4,988,525
535 4,988,526
536 4,988,527
557 4,988,528
569 4,988,529
577 4,988,530
578 4,988,531
594 4,988,532
595 4,988,590

CLASS 427

38 4,988,533
4,988,534
4,988,535
39 4,988,536
46 4,988,537
53.1 4,988,538
126.3 4,988,539
155 4,988,540
163 4,988,541
172 4,988,542
372.2 4,988,543
384 4,988,544
440 4,988,545

CLASS 428

34.2 4,988,546
35.2 4,988,547
35.7 4,988,549
40 4,988,550
4,988,551
99 4,988,553
142 4,988,554
172 4,988,555
195 4,988,556
204 4,988,557
213 4,988,558
219 4,988,559
297 4,988,560
323 4,988,562
331 4,988,561
341 4,988,563
368 4,988,548
4,988,564
373 4,988,565
402 4,988,567
4,988,568
403 4,988,569
407 4,988,566
409 B1 4,550,059
411.1 4,988,570
412 4,988,571
413 4,988,572
421 4,988,573
425.9 4,988,574
447 4,988,514
469 4,988,575
537.1 4,988,576
573 4,988,577
677 4,988,552
678 4,988,578
690 4,988,579

CLASS 429

17 4,988,283
19 4,988,580
27 4,988,581
30 4,988,582
4,988,583
50 4,988,584
66 4,988,585
194 4,988,587
209 4,988,588
222 4,988,589

CLASS 430

43 4,988,591
58 4,988,592
4,988,593
59 4,988,594
4,988,595
4,988,596
62 4,988,597
99 4,988,598
109 4,988,599
110 4,988,600
115 4,988,602
192 4,988,601
264 4,988,603
4,988,604
270 4,988,605
4,988,606
271 4,988,607
296 4,988,284
325 4,988,608
326 4,988,609
449 4,988,610
494 4,988,611
531 4,988,612
547 4,988,613
552 4,988,614
576 4,988,615

CLASS 431

5 4,988,285
175 4,988,286
284 4,988,287

CLASS 432

72 4,988,288
103 4,988,289
4,988,290

CLASS 433

5 4,988,291
8 4,988,292
4,988,293
134 4,988,294
141 4,988,295
163 4,988,296
173 4,988,297
4,988,298
174 4,988,299

CLASS 434

247 4,988,300
410 4,988,301

CLASS 435

4 4,988,616
6 4,988,617
4,988,618
30 4,988,619
199 4,988,620

CLASSIFICATION OF PATENTS

240.2 4,988,621
252.34 4,988,622
286 4,988,623
298 4,988,302
320.1 4,988,624

CLASS 436

5 4,988,625
148 4,988,626
165 4,988,627
173 4,988,628
518 4,988,629
533 4,988,630

CLASS 437

4 4,988,631
31 4,988,632
34 4,988,633
41 4,988,634
43 4,988,635
51 4,988,636
52 4,988,637
57 4,988,638
67 4,988,639
81 4,988,640
83 4,988,641
101 4,988,642
200 4,988,643
225 4,988,644

CLASS 439

13 4,988,304
65 4,988,305
66 4,988,306
188 4,988,307
248 4,988,308
318 4,988,309
342 4,988,310
404 4,988,311
581 4,988,312
621 4,988,313
628 4,988,314
668 4,988,315
744 4,988,316

CLASS 441

46 4,988,317

CLASS 445

26 4,988,318

CLASS 446

19 4,988,319
62 4,988,320
075 4,988,321
120 4,988,322
334 4,988,323
383 4,988,324
397 4,988,325

CLASS 452

2 4,987,644
65 4,987,641
136 4,987,642

CLASS 455

95 4,989,260
127 4,989,261
138 4,989,262
182 4,989,263
266 4,989,264

CLASS 460

110 4,988,326

CLASS 464

111 4,988,327

CLASS 474

160 4,988,328

CLASS 475

337 4,988,329

CLASS 493

16 4,988,330
171 4,988,331
196 4,988,332

CLASS 501

91 4,988,645
98 4,988,646
99 4,988,647
126 4,988,648
133 4,988,649
134 4,988,650
135 4,988,651

CLASS 502

24 4,988,652
67 4,988,653
84 4,988,654
108 4,988,655
127 4,988,656
158 4,988,657
174 4,988,658
235 4,988,659
303 4,988,660
327 4,988,661

CLASS 503

208 4,988,662
226 4,988,663
227 4,988,664
4,988,665
4,988,666
4,988,667

CLASS 505

1 4,988,668
4,988,669
4,988,670
4,988,671
4,988,672
4,988,673
4,988,674

CLASS 514

4 4,988,675
21 4,988,676
30 4,988,677
50 4,988,678
53 4,988,679
81 4,988,680
93 4,988,681
150 4,988,682
165 4,988,683
177 4,988,684
202 4,988,685
203 4,988,686
206 4,988,687
212 4,988,688
4,988,689
213 4,988,690
214 4,988,691
221 4,988,692
231.2 4,988,693
235.5 4,988,694
248 4,988,695
250 4,988,696
252 4,988,697
254 4,988,699
255 4,988,700
4,988,701
258 4,988,702
262 4,988,703
275 4,988,704
282 4,988,705
284 4,988,698
299 4,988,706
303 4,988,707
312 4,988,708
314 4,988,709
318 4,988,710
326 4,988,711
340 4,988,712
356 4,988,713
4,988,717
357 4,988,714
363 4,988,718
369 4,988,719
377 4,988,720
383 4,988,715
4,988,721
4,988,722
392 4,988,723
399 4,988,724
406 4,988,725
411 4,988,726
422 4,988,727
448 4,988,728
452 4,988,729
466 4,988,730
554 4,988,716
560 4,988,732
575 4,988,733
577 4,988,731
624 4,988,734
648 4,988,735
652 4,988,736

CLASS 521

26 4,988,737
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DESIGN PATENTS

04 :	314,121		314,205		314,141		314,263		314,139	42 :	314,090
05 :	314,217		314,218		314,173	27 :	314,112		314,146		314,124
06 :	314,081		314,226		314,177		314,258		314,215		314,142
	314,084		314,255		314,191	31 :	314,225		314,230		314,158
	314,104	08 :	314,107		314,211		314,237		314,231		314,216
	314,113	09 :	314,087		314,220	33 :	314,077		314,232		314,253
	314,119		314,131	18 :	314,163	34 :	314,097		314,254	44 :	314,160
	314,122		314,249		314,214		314,134	37 :	314,222		314,213
	314,128	10 :	314,241		314,227		314,238	39 :	314,123	45 :	314,164
	314,150	12 :	314,116		314,270		314,242		314,169	48 :	314,120
	314,159		314,172	19 :	314,078	36 :	314,080		314,178		314,126
	314,162		314,187		314,192		314,083		314,229		314,236
	314,165		314,195		314,199		314,091		314,233		314,251
	314,166	13 :	314,082		314,223		314,092		314,239	50 :	314,086
	314,167		314,148	20 :	314,234		314,093		314,257	51 :	314,127
	314,168	15 :	314,268	25 :	314,157		314,094	41 :	314,079		314,267
	314,171	17 :	314,108	26 :	314,256		314,095		314,105	53 :	314,106
	314,176		314,114		314,261		314,096		314,132		314,209
	314,182		314,140		314,262		314,109		314,221	55 :	314,248

PLANT PATENTS

06 :	7,431	7,432	7,434	7,435	41 : 7,433

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

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SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ **Domestic; @ $** **Foreign.**

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

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PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

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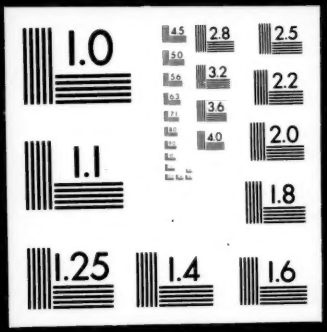
U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*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